

# ATTACHMENT III

## TO THE

## GLOBAL FOOD SECURITY RESPONSE WEST AFRICA RICE VALUE CHAIN ANALYSIS



# GLOBAL FOOD SECURITY RESPONSE MALI RICE STUDY

microREPORT #158

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## ACRONYMS

AFD	Agence Française de Développement
APCAM	Assemblée Permanente des Chambres d'Agriculture du Mali
BEE	Business Enabling Environment
BNDA	Banque Nationale de Développement Agricole
CAADP	Comprehensive Africa Agriculture Development Program
CAE	Center for Agro-Enterprise, USAID
CFA	Central African Franc
CIDA	Canadian International Development Agency
CNFA	Citizens' Network for Foreign Affairs
CPS/MA	Cellule de la Planification et de la Statistique/Ministère de l'Agriculture
CRA	Chambre Régional d'Agriculture
CSV	Crédit Stockage Vivrier
DAD	Delta Agricultural Development Project
DNSI	Direction Nationale de la Statistique et de l'Informatique
ELB	Extra-long Blanchi
GGB	Grand Grenier du Bonheur
GOM	Government of Mali
На	Hectare
IER	Institut d'Economie Rurale
IFPRI	International Food Policy Research Institute
IICEM	Initiatives Intégrées pour la Croissance Economique au Mali
Kg	Kilogram
MCC/MCA	Millennium Challenge Corporation/Millennium Challenge Agency
MFI	Microfinance Institution
Mm	Millimeter
MT	Metric Ton
NEPAD	New Partnership for Africa's Development
OMA	Observatoire des Marchés Agricoles
ON	Office du Niger
OPAM	Office des Produits Agricoles du Mali
ORM	Office de Riz Mopti
ORS	Office de Riz Ségou
PACCEM	Projet d'Appui à la Commercialisation des Céréales au Mali
PASSIP	Programme d'Appui au Sous-secteur de l'Irrigation de Proximité
PRODEPAM	Projet de Développement de la Production Agricole au Mali
SERIMA	Société d'Exploitation des Rizeries du Mali
SME	Small and Medium-sized Enterprise
UEMOA	Union Economique et Monétaire Ouest Africaine
USAID	United States Agency for International Development
VAT	Value Added Tax

# EXECUTIVE SUMMARY

Rice is a crop of strategic importance for Mali. It has been "the success story" of Malian agriculture over the last two decades. Yields have been rising steadily over this time, particularly since the devaluation of the CFA franc. Over the period of 1980 to 2004, total value added from rice production rose by an average of 9.3 percent per year—the highest increase for any agricultural crop. It now accounts for 12.3 percent of agricultural value added (up from 4.3 percent in the 1980s). This success has been fueled mainly by public-led investments in large-scale, gravity-fed irrigation infrastructure and by an improvement in the enabling environment through the progressive withdrawal of the state from rice marketing and processing. This success can be attributed to the response of rice farmers to the liberalization of marketing and processing in the main production zone of the Office du Niger (ON) during the late 1990s and early 2000s. As a result of these reforms, a large number of farmers adopted improved production practices—particularly the transplanting of seedlings instead of broadcast sowing. This has been accompanied more recently by an increase in the use of fertilizer due to the increased availability of production credit in the ON zone during the last four to five years.

Rice production in Mali is based on a variety of productive systems that exhibit significant differences. The six main types of production systems are:

- Large-scale, gravity-fed systems in the ON zone and much smaller systems around the Baguinéda and Selingué dams.
- Small-scale village systems irrigated by diesel pumps that raise water from the Niger River. These systems, called "irrigated village perimeters," are located mainly in the Timbuktu and Mopti Regions.
- Controlled flooding systems where rising river water is channeled to fill a flood plain and the release and drainage is controlled to prolong the season and avoid flood damage. These systems are most prevalent around Mopti and Segou.
- Traditional uncontrolled planting on riverside flood plains in the same zones where controlled flooding is practiced.
- Rainfed rice cultivation with small-scale water retention structures in lowlands (*bas fonds*) to enhance natural land contours and permit the controlled use of surface water. These systems are based in the Southern cotton belt.
- Rainfed rice on upland areas where rainfall exceeds 800 to 1,100 mm/year. The largest concentration of these production systems is also in the cotton belt in the Sikasso Region as well as the Kayes and Koulikoro Regions.

The major locus of rice production in Mali is the Segou Region, which includes the ON lands and the adjacent smaller Office Riz Segou (ORS) zone of controlled flooding parcels. This area supplies an estimated 87 percent of the total supply of rice available for trade outside the production region after meeting local consumption needs. In most of the other productive systems and zones, rice tends to remain in nearby local markets. Thus the vast majority of rice traded over significant distances comes from the core ON/ORS zone. This zone is the most advanced rice-producing area as it generally has larger farms and a much higher adoption rate of improved technologies, including certified seeds, fertilizers and transplanting practices. It has also been the locus of private micro-entrepreneur investment in mobile rice hullers that provide critical milling services to the vast majority of small farmers in the zone. Lastly, because of the large number of hectares under total water control, Segou is the only region in Mali that can dependably produce a sizeable surplus in drought years when production drops precipitously in controlled flooding and rainfed systems.

### **MARKET TRENDS**

There are two major dynamic trends in the rice value chain. The first is the significant increase in rice prices beginning in the 2007 to 2008 season, which seems to be driven by a combination of higher international prices and an increase in demand for local rice. Especially over the past year, prices of local rice have continued to remain quite high relative to imports—despite a long-term trend of rising production that has far outstripped the rate of population growth. This would seem to indicate that the consumption of rice, and particularly local rice, is rising, possibly due to a switch in demand from other cereals.

The second clear trend is the emergence of a specific market segment for high-quality local rice. This new trend means that the market for local rice is bifurcated into two main segments:

- (a) A high-end segment consisting exclusively of local rice that has been polished to give it a good luster and has been cleaned of impurities. Often the rice is sorted and undergoes size calibration to ensure a homogenous mix of rice grains (usually long grain or broken grains).
- (b) A mass market segment consisting of imported rice and un-cleaned, heterogeneous mixes of local rice.

As a result of these two trends, the price environment has evolved such that rice production in Mali has become very profitable—with farmgate prices lying well above production costs. Thus there is little doubt that Mali is a competitive producer of rice in the local consumption market. Competiveness is beneficial for the large-scale, gravity-fed ON system, as well as for smaller irrigated village perimeters and rainfed and controlled flooding systems. In all of these systems, current market prices are significantly above production costs. A farmer in the ON zone, for example, producing in the spring 2009 off-season and following the most common practice of using a mobile huller would earn a net margin of 145 CFA/kg on sales of 300 CFA/kg—a net margin of 48 percent. As this analysis indicates, even with a downward adjustment in prices to account for the usual price drop in the main production season, there is a clear economic incentive for farmers to produce more rice.

Similarly, with a 15 to 20 percent price premium for the high-end market segment, a diverse group of value chain actors have started to position themselves to supply this emerging market. The actors who have or are in the process of devising strategies to do this include the two industrial mills belonging to wholesaler/importers, a small number of SME "mini rice mills" and some informal market retailers/sorters who hand-sort and clean mixed lots of rice. All of these players have developed business strategies to capture part of this market, which remains small with limited quantities of high-end rice available.

### **VALUE CHAIN ACTORS**

The rice value chain map is shown on page 25. It depicts the market linkages in the rice value chain as they appear in the Segou Region. Major value chain actors in the map include:

**Small family farmers.** These are either traditional smallholders established on ON lands or any of the smallholders in the ORS zone. Farm sizes are generally less than 3 hectares. The level of mechanization is quite low with farmers generally paying SME service providers or farmer organizations for harvesting, threshing and rice milling.

**Commercial farms.** These are farms that operate in the ON zone through special 30- or 50-year lease arrangements that were designed to attract business-oriented farmers who could invest in irrigation infrastructure. The farm size for this type of occupant ranges from 5 hectares to over 100 hectares. The larger farmers in this category possess harvesting and hulling equipment that enables them to sell milled rice directly to semi-wholesalers or urban consumers.

**Farmer organizations.** The term "farmer organization" embraces a number of different types of entities in the ON lands. Primary-level farmer organizations include village associations, which have a politico-administrative role as the

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lowest level of territorial administration, more loosely defined farmer groups formed under non-profit association statutes and increasingly, cooperatives.

**Mini rice mills.** Mini rice mills provide hulling services to farmers in a fashion that is similar to the small portable rice hullers that are prevalent in the ON zone. The difference vis-à-vis these mobile hullers is that the mini rice mills use superior milling technology that offers improved performance in terms of loss rates. They have the potential for achieving up to 72 percent in net yield (if paddy quality is perfect) and a standard average of around 60 to 62 percent (if paddy is of average quality). In contrast, mobile hullers usually operate with a 50 to 60 percent net yield and may often inflict damage on the rice that reduces its commercial value.

**Collectors.** These are small-scale traders who purchase rice either at the farm or in local weekly markets in the major production zones and then transport rice to major market centers. They play critical roles in assembling small quantities of rice from farmers into larger quantities to sell to wholesalers and in spatial arbitrage (storing rice for farmers that lack storage space to sell when the price is higher).

Wholesaler/importers. Wholesaler/importers are the actors with the highest financial and business capacity in the rice value chain. Most of the volumes at this level are dealt by only three operators: GDCM-SA/Moulin Moderne, Groupe AMI/Grand Moulin du Mali and Grand Grenier du Bonheur (GGB). These are diversified cereals traders with several business entities that deal in other cereals and also own industrial wheat flour mills. For these actors, local rice is somewhat of a sideline; their main business is furnishing imported milled wheat flour through a distribution network of dealers and representative stores throughout Mali. In this context, their finance, transport and storage facilities allow them to augment their throughput by adding imported rice and, on a smaller scale, local rice when the margins are attractive relative to imported rice.

**Semi-wholesalers.** These are the main clients of the travelling collectors who bring rice to the major urban areas. They are usually located in warehouses near the major urban markets. They also purchase imported rice from importers/wholesalers.

**Market retailers/sorters.** One of the new developments in the rice value chain over the last five years is the emergence of a new category of retailers who hand-sort mixed lots of Malian rice that they sell to consumers in the high-end market segment. The major locus for this is the market across from the Grand Mosque in Bamako.

**Retailers.** Most rice retailers are installed in open-air markets or in neighboring storefronts. These retailers either buy from collectors directly arriving from the country or from semi-wholesalers in Bamako.

### SYSTEMIC CONSTRAINTS

Despite the underlying competitiveness of Malian rice, there is little new private investment flowing to rice production or processing. The major catalyst for dynamic changes in the value chain since the first wave of liberalization in the mid 1990s and early 2000s has been and continues to be donor and Government of Mali (GOM) projects. Reasons for the lack of private investment in the value chain stem from a number of constraints related to the business enabling environment and the nature of the rice value chain itself. These systemic constraints are listed below.

### **BUSINESS ENABLING ENVIRONMENT CONSTRAINTS**

There are four critical binding constraints in the business enabling environment that impede value chain growth. These are most evident in the zone of the Office du Niger, since this is the zone with the most complicated value chain relationships that relate to factors in the enabling environment. 1. There is a significant heritage of mutual distrust between actors in the value chain and in the enabling environment that inhibits market-based cooperation. With the checkered history of private-sector involvement in rice marketing and input supply in the ON zone, combined with the involvement of donor projects and politicians in the design of farmer organizations and their marketing strategies, there is both a lingering climate of distrust between farmers and traders and a tendency among both groups to seek a competitive advantage through non-market means. For wholesalers/importers, this means obtaining exonerations from import taxes. For farmer organizations, this may mean concluding marketing agreements that are more oriented towards pleasing politicians than farmers. For farmers, this may mean gaining access to subsidized goods (including credit—which may not be paid back) through projects or preferential treatment from project-supported farmer organizations. Compounding these problems is the fact that the lack of secure land tenure in the ON zone and the diverse ethnic character of the families receiving occupation rights significantly weaken many of the normal cross-cutting social ties that ensure village-level cohesion. Often, this contributes to governance problems and a lack of accountability for bad debt in farmer organizations.

2. Import exonerations discourage upstream involvement on the part of wholesaler/importers, who have the potential to become lead firms in the value chain. In three of the past four years the GOM has granted exonerations from normally applicable tax and tariffs on imported rice for a limited number of wholesaler/importers. These measures have either eliminated or reduced the normal 32 percent level of protection that comes mainly from the import VAT and tariff. The unstable nature of the current import taxation regime upsets market equilibriums and creates a high level of uncertainty among wholesaler/importers that makes it hard for such actors to justify concerted efforts to develop domestic supply channels.

**3.** Subsidies from the Government of Mali discourage private-sector involvement in the rice value chain. The GOM's new *Initiative Riz* program to stimulate rice production is a laudable attempt to provide some strategic impetus to the rice value chain's development. Unfortunately, its subsidy program for equipment is implemented in a way that largely bypasses private operators, thus discouraging their greater involvement in the value chain. This is especially critical at the processing level, as five mini rice mills allocated in 2009 were all set up in farmer organizations—one in each of the main subdivisions of the ON. This practice of favoring farmer organizations as the locus for investments in processing technology and subsidizing equipment poses the problem of crowding out private SME actors.

4. Weak and conflicted farmer organizations. The performance record of farmer organizations is mixed. In some areas, such as the Southern lowlands zones where the USAID IICEM project has been working with groups of women farmers, projects have had success in organizing farmer groups that have played critical catalyzing roles in introducing improved agricultural methods and increasing rice production. But these successes are far from universal. Particularly in the ON zone, where most rice is produced in Mali, difficulties abound. The entire farmer organization system in this area had largely collapsed by the early 2000s under the weight of unpaid input loans that left only around 30 percent of groups eligible to access credit. The apparent failure of the heavily supported Faso Jigi marketing initiative in the ON is matched by the widespread preference of farmers for selling milled rice to collectors—who generally offer better prices than Faso Jigi—or other farmer groups outside of the Faso Jigi system. Thus, the failure of farmer groups to become effective marketing agents for rice is virtually universal. In contrast, farmer organizations have had much more success as intermediaries that reduce the transaction costs of external support service providers to small farmers, as opposed to acting as economic centers of profit and loss themselves.

**5.** The lack of secure land rights and effective sanctions for inadequate irrigation infrastructure maintenance have combined to diminish yields and lower paddy quality in the ON. While the official ON figures for production show yields of around 6 tons per hectare in rehabilitated plots, rice analysts acknowledge that the true figures are around 4.5 tons per hectare. Although non-optimal fertilizer applications and formulas along with a lack of respect for planting protocols may be responsible for some of the difference, most of the reasons for the unfulfilled yield potential are thought to be related to inadequate water control—principally the poor drainage in many sections

of the ON. The root cause behind this constraint lies in the complicated interplay between the various actors in the ON. At the lowest level, farmers who are unsure if they will retain access to their land because of failure to pay water user fees have little incentive to fulfill their maintenance obligations to clean their field and adjacent tertiary canals and evacuation channels. At the next level, water user groups organized by the ON have no ability to enforce sanctions for non-compliance; nor do farmer groups. Lastly, the ON itself is in a state of non-compliance in many zones. The end result of this cascading lack of respect of maintenance obligations is an environment in which incentives to maintain irrigation are gradually eroded by institutional passivity and the diffusion of responsibility.

### CONSTRAINTS RELATED TO QUANTITY OF PRODUCTION

**1. Lack of access to water.** Rice cultivation in Mali is dependent on access to irrigated water. Even in areas with rainfall of over 800 mm, productivity can be improved and inter-annual variability reduced through the construction of small-scale water retention structures to create small reservoirs with controlled water release. Therefore, achieving increases in rice production based on expanding land area will inevitably require new investments in engineering surveys and construction of new irrigation systems. Since prior experience with using long-term debt instruments to favor farmer funding of infrastructure have not yielded promising results, this will depend on the availability of donor or GOM financing for water infrastructure.

**2. Lack of access to farm-level training and extension.** There are well-adapted technical packages for rice cultivation for all the systems of production in Mali. However, farmer access to effective extension advice and technical support is virtually non-existent, especially outside of the main zone of rice production in the ON. Diffusion of knowledge about appropriate varieties and improved planting techniques (primarily transplanting) for controlled flooding and rainfed lowland and upland systems is quite low. Project-supported extension systems provide virtually the only vehicles for such training in Mali, given the lack of adequate input-supply dealer networks.

**3.** Lack of capital and access to finance among start-up farmers outside of the ON zone. Small farmers operating in irrigated village perimeters, controlled flooding and rainfed systems are generally poorer and more marginalized compared to small farmers in the ON. Without capital resources to finance the start-up costs of cultivating new rice areas, or farmer organizations with established track records for accessing credit, such farmers usually require some form of initial capital grants to be able to improve rice production. Beyond the first year, financing through village solidarity groups is feasible, but also requires a heavy investment in training and farmer organization strengthening and even capacity building for local microfinance institutions (MFIs).

### CONSTRAINTS RELATED TO THE QUALITY OF MARKETED RICE

**1. Poor processing technology.** Since about 80 percent of marketed rice that travels any significant distance is fed through small mobile hullers, the inherent limits of this technology impose a significant constraint on the overall quality of Malian rice. Even with "correction" through the cleaning and sifting of rice later in the value chain, the high levels of loss from lower technical rates of transformation impose a significant added cost that cannot be recovered.

**2.** Poor quality of unhulled paddy rice. Poor post-harvest handling can inflict serious damage to paddy that results in high loss rates during hulling and stained or discolored grains that sell at a significant discount, if at all. All actors report that problems related to persistent humidity in many of the fields of the ON due to inadequate drainage have been contributing to poor paddy quality. Indeed, since it is extremely difficult to judge the quality of paddy unless it is actually hulled, some actors, including mini rice mills that target the high-quality market, prefer to re-process rice already hulled by mobile units in order to avoid losses associated with purchasing substandard paddy.

## **OPPORTUNITIES FOR UPGRADING**

Opportunities for upgrading in the rice value chain lie in two major areas: opportunities for increasing production volumes and opportunities for improving product quality to increase the supply of rice flowing to the high-end market segment. Each of these is discussed below.

### UPGRADING TO INCREASE THE SUPPLY OF RICE

Despite the underlying profitability of rice production, there has been little investment by farmers outside of the ON zone in expanding rice areas or in introducing improved techniques except where there are programs operated by the GOM or donors. The main reason for this is that, until now, incentives for investment in rice production at the farm level were linked to the unavoidable issue of access to water. This can be seen by the contrasting demand for land in the ON zone, with excess demand for land that has ready access to irrigation canals, against the plethora of unsubscribed "potential" lands for lease for which there are no takers other than donors. In the later case, the condition that leaseholders invest in the needed irrigation systems is dissuasive. Thus it is clear that the underlying profitability of rice production has not yet motivated farmers or private-sector actors to invest in water retention infrastructure on any significant scale.

This is somewhat surprising since irrigation investment costs are not so large as to render rice production unprofitable even if they are included in the cost of production. In Mali, however, making these investments is a task largely left to donors and the GOM. Farmers lack the technical ability to organize and supervise the needed engineering. Nor have past experiences with using farmer debt instruments to finance long-term infrastructure investments yielded promising results. In this context, it is clear that the best opportunities for increasing production volumes lie in two main categories:

- Financing an expansion of rice areas with new investments in irrigated infrastructure that are relatively cost effective. With the fundamental profitability of rice well-established, there is a sound economic rationale for donors to invest in irrigation infrastructure. A ranking of the costs of irrigation infrastructure in terms of potential rice output indicate that investments in controlled flooding systems have the highest yield in terms of production per infrastructure dollar, followed by irrigated village perimeters. As far as gravity-fed systems, the ON has already obtained commitments to finance an over 50 percent increase in current irrigated areas. Thus there would seem to be little reason to consider new investments to expand areas in the ON.
- Supporting the GOM's effort to expand rainfed rice in uplands. The possible expansion of rice areas without any corresponding investment in water retention structures would be a major step forward for the rice value chain and for food security in Mali. The GOM's *Initiative Riz* is placing a strong emphasis on the cultivation of a new variety, Nerica 4, which is suitable for rainfed uplands with a minimum rainfall threshold of 800 to 1,100 mm per year. This part of the *Initiative Riz*'s agenda would benefit from added support from donors in such areas as farmer group strengthening, agronomic trials and extension, credit system development and, after volumes have responded, in post-harvest processing and marketing.

### UPGRADING OPPORTUNITIES TO IMPROVE RICE QUALITY

Incentives for improvement in product quality are clearly positive in the emerging high-quality segment of the market for local rice. With a price premium in the market for well-sorted, clean and homogenously sized local rice relative to standard mixed-quality rice coming from mobile hullers, wholesaler/importers such as Groupe AMI and GDCM-SA have already noticed the extra margins to be had from selling cleaned and sorted Malian rice. To produce such rice they either have to enter the paddy market and hull the rice themselves, work through a network of mini rice mills

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able to achieve high-quality standards, or sort through hulled rice that has already been processed and partially damaged by small mobile hullers. Farmer organizations are key potential partners in each of these cases, since their involvement is critical in addressing the paddy quality issue prior to the point of hulling—whether this is done in a larger industrial setting or by a local mini rice mill. The potential for such cooperation is only now becoming apparent, driven by the emergence of the demand for high-quality rice.

Upgrading of quality requires actions on two levels: (a) introducing improved processing technology with lower loss rates that can produce a clean sorted product; and (b) developing a mechanism for ensuring access to better-quality paddy. These two requirements are inextricably linked. Without good-quality paddy, the return on investments in new processing equipment will be lessened by the poor quality of the product passing through it.

The ways in which these gains could actually be realized could take several forms:

- mini rice mills operating independently and marketing an improved product to upper-level value chain clients
- vertical alliances between wholesaler/importers and mini rice mill suppliers
- industrial millers (wholesalers/importers) directly sourcing paddy through local agents and farmer groups, thus bypassing mini rice mills altogether

In addition to the purely technical issue of producing improved-quality rice, a clear potential exists to develop an export market over the medium term. But this will be linked to two prerequisites: (a) the realization of significant increases in volume of quality rice production; and (b) the emergence of actors who are able to fulfill contractual agreements to provide specified qualities of Malian rice that respect standard norms in large volumes. It also assumes that the GOM will not try to implement a ban on the export of food products as it did between 2007 and 2008.

## STRATEGY

### VISION

By the end of 2019, Mali will have realized a significant increase in rice production volumes with an increase in paddy production from 1.6 million tons to 3.9 million tons (an increase of 244 percent). This will be driven by a 150 percent increase in areas under total control in the ON and by an exponential increase in volumes from rainfed rice with the adoption of Nerica 4. Further increases will come mainly from an expansion of controlled flooding and irrigated village perimeter systems. In addition, an estimated 1.5 million tons of high-quality milled rice per year will be exported to feed expanding demand in regional markets. The rice sector will be transformed through the progressive re-orienting of the milling function from poorly performing mobile rice hullers to stationary SME mini rice mills with an inflow in private investment and the emergence of clearly defined grades and standards for both paddy and sorted hulled rice. This will encourage small farmers to improve post-harvest handling to capture new price incentives linked to paddy quality. The differentiated market segment for high-quality paddy will largely feed the growing "high-end" local consumer segment and the regional export market with the involvement of Malian cereals importers. These importers will begin to add a line of high-quality rice exports, possibly with a shared product branding strategy, to their continuing imports, consisting mainly of lower-quality, inexpensive Asian rice for poorer consumers. Because of the large increase in rice volumes, increase in consumer prices of rice are moderate, which has a significant impact on overall poverty rates because of the rising share of rice in household consumption. However, because of the opening of an export channel, rural rice producers are able to enjoy higher farmgate prices for rice sold into the high-quality segment of the market without this having a negative effect on the poverty rates of the most vulnerable households.

### VALUE CHAIN COMPETITIVENESS STRATEGY

To achieve the above vision for the rice value chain, with its ambitious volume targets, more needs to be done in the area of production support. This will entail USAID, the GOM and other donors deciding in which productive system they wish to allocate support for production—following known formulas that have demonstrated their ability to produce results. While necessary, these activities will not, however, be sufficient to facilitate the qualitative change in the value chain that must accompany the growth in productive volumes if Mali is to improve rice qualities to the point where it can become a major exporter in the region and raise rural incomes significantly in rice producing areas.

The missing element in the value chain, as it is currently structured, is the lack of strong private investment in production, post-harvest handling and processing—particularly in the core ON region. To a large extent, this reflects the simple nature of the rice value chain after the first generation of reform, in which small-scale farmers, mobile hullers, collectors and semi-wholesalers rushed in to fill the territory being vacated in the value chain by the progressive withdrawal of the ON. During this initial period, which lasted until the mid 2000s, market incentives were not yet clear to the main actors, nor were the appropriate institutional structures in place (the most important being strong farmer organizations) to provide well-functioning horizontal linkages among the many small farmers that could provide points of leverage to buyers and service providers.

Today, however, the situation has evolved. The increasingly favorable price environment for rice since the 2007 to 2008 season has improved incentives all along the along the value chain. New experiments and plans are being formulated by wholesaler/importers and SME mini rice mills showing that there is some renewed interest in improving processing technology. Furthermore, much progress has been made in cleaning up the financial and institutional disarray among farmer organizations in the ON after the disastrous problems of the late 1990s and early 2000s. Support markets for seeds and fertilizers, if not working perfectly, are at least in better shape than they were five years ago.

Despite this evolution, there is still very little private investment in the rice value chain. Nor is there much progress towards improving the coordination between production, processing and marketing that is required if Mali is to achieve its vision of developing into a regional supplier of quality rice. GOM strategies for introducing improved technology still largely by-pass private firms—focusing instead on farmer organizations, which have not proven to be effective marketers, let alone processors and marketers.

To bring change to the status quo and dynamize the value chain with an injection of private sector-led investment and vertical cooperation between firms, USAID needs to address the key obstacles in the enabling environment and buy down some of the risk to private-sector actors of investing in improved processing, post-harvest handling and, eventually, even in production. Activities aimed at doing this appear in the three axes of the competitiveness strategy presented below.

### AXIS ONE: SUPPORTING PRODUCTION

Increasing rice production will have a direct positive impact on food security and rural incomes. The assistance packages for helping rural households move to higher levels of production with improved inputs and investments in water infrastructure have been well-established by USAID projects over the past ten years. The technical components of these packages entail intensive assistance to producer groups in the following areas:

- Training on water infrastructure maintenance and formation of water user groups that are appropriate to the scale of the infrastructure put into place
- Formation and capacity building for producer organizations to prepare them to help farmers in accessing credit for inputs, providing harvesting and storage services

- Developing seed multipliers in conjunction with national seed service research stations using appropriate varieties
- Providing mechanisms of extension training in conjunction with farmer associations or other local business service providers
- Developing financing products with local MFIs and financial institutions to serve the needs of producers for production and marketing finance, including warehouse-based collateral schemes to prolong production finance
- Administration of grants to capitalize farmers and producer organizations in start-up campaigns

Given the substantial investments programmed for the ON zone over the next five years, USAID support for production should be focused on lands outside the ON. The areas of highest priority that should be considered for such support are (in descending order):

- 1. Areas suitable for the cultivation of upland rainfed rice. The potential for increasing rice areas in zones with suitable rainfall by planting Nerica 4 without investing in associated water retention structures is an exciting new possibility. This strategy is at the heart of the GOM's efforts to increase production under the *Initiative Riz*.
- 2. Areas suitable for controlled flooding. With the extremely low cost per hectare for simple dike systems that can cover large flood plains, investing in controlled flooding water infrastructure is also extremely cost effective.
- 3. Areas suitable for irrigated village perimeters. With a cost per kilogram of production that is only slightly more expensive than controlled flooding systems, irrigated village perimeters are another viable option for receiving production support.

Increasing the volume of production in each of the above systems will have an immediate impact on food security in the targeted regions by increasing the availability of rice for producing households. This is especially true in the Southern region around Sikasso, where uplands rice is an attractive alternative to cotton, which is in the midst of a structural downturn due to falling international prices. In such a context, rice can provide both an important nutritional supplement and a cash infusion for households that have marketed surpluses. The impact on food security of expanded rice cultivation for households hit by the downturn in the cotton value chain is, thus, potentially enormous. Even in other areas not explicitly affected by the downturn in cotton, such as the Southern lowlands and areas next to the Niger River in Mopti and Timbuktu, increasing rice production can help improve food security and lower rates of malnutrition.

### AXIS TWO: IMPROVING RICE QUALITY

Improving rice quality is of critical importance to the rice value chain for two reasons. The first and most apparent reason is that it is necessary to enable Mali to become a rice exporter. The second reason, which is not immediately apparent, is that improving quality provides the best and most direct way of overcoming the many obstacles that are standing in the way of increased vertical cooperation in the value chain between actors at the marketing, processing and production levels. Actors such as Groupe Ami, GGB and a few mini rice mills have realized that there are higher margins to be had from selling rice of a good quality—but they are unable to increase their volumes in this segment on their own. They each need the collaboration of actors on other levels of the value chain. By working to eliminate the constraints that are keeping these actors from working together, USAID can not only help to develop the high-quality segment of the rice market, but it can catalyze much-needed structural changes in the value chain that will lead to an overall increase in efficiency.

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The potential impact of increasing efficiency through better inter-firm cooperation along vertical linkages in the value chain can be enormous. This will do much more than just improve quality; it could also lead to significant increases in volumes and the resolution of long-standing problems. USAID can help to make this happen by encouraging the development of value chain alliances with key value chain actors built on improved vertical cooperation focused on product quality in a way that includes, rather than excludes, private-sector actors in partnerships with farmers.

In terms of volumes, the potential gain from improving productivity in the ON through private sector-farmer alliances built around improved quality is hardly negligible. An increase in the technical yield rate for hulling from the current estimated average of 55 percent to a 70 percent maximum for perfect quality paddy on 10,000 hectares, or 1/10 of the cultivated ON lands, would yield an extra 9,000 tons of rice just from reduced losses in one season— about one-quarter of the Timbuktu Region's estimated annual consumption needs.

Activities to improve quality would be divided into two components:

**Component 1: Promoting private sector-led investment in improved processing technology.** USAID would have private entrepreneurs introduce improved processing technologies (such as mini rice mills) as part of a commercial strategy to increase sales of quality rice defined as either: (a) clean polished rice that has not gone through any size calibration but is completely free of rice husk, debris and rice flour; (b) homogenous lots of sorted and calibrated broken rice; and (c) homogenous lots of pure 'extra-long' rice. Investment in equipment to produce these products can cost anywhere from \$5,000 to \$58,000, so the level of target entrepreneur is at the SME level or above. The intervention focus should be in removing blockages to investment and buying down risk for potential new investors, as well as helping current actors to expand their processing activities.

**Component 2: Developing market-led systems to improve the quality of paddy production.** Actions under this component would be closely linked to the geographic patterns in investment resulting from component one. The strategy would be to identify farmer organizations or even groups of individual farmers in the ON that agree to supply improved-quality paddy to mini rice mills or wholesalers/ importers. Potential partners include Faranfasi So and Faso Jigi, as well as ordinary first-level farmer organizations. The key idea is not that USAID will select "beneficiaries," but that private-sector players—likely led by mini rice mills but also by wholesaler/importers—will start to identify geographic areas of preference or partners of preference within the ON/ORS zone. USAID can accelerate this process by underwriting some of the costs of discovery and relationship building, while also directly aiding both partners to fulfill initial obligations to the other.

### AXIS THREE: ADDRESS CRITICAL BUSINESS ENABLING ENVIRONMENT CONSTRAINTS

Although much can be done to improve the business enabling environment at the firm level by bringing value chain actors together around a clearly defined project to increase rice quality, a few key policy constraints are unlikely to be resolved without high-level commitment on the part of the GOM and without a wider consensus among actors in the value chain. These are, in rough order of importance:

• Working with rice value chain actors to convince the government to stabilize and reduce the magnitude of import exonerations. Changes in the level of protection have a significant impact on the structure of the value chain—particularly in how they affect the business strategies of the wholesalers/importers. While local rice can still be produced and sold profitably even without protection, wholesaler/importers have much less incentive to invest in improving their domestic supply chains when market equilibriums are regularly disrupted by fluctuations in the level of protection that significantly raises the attractiveness of imports. Thus it will be difficult to secure a commitment of these potential lead-firms to the strategy of improving quality until there is a stable and predictable level of protection.

- Working with rice value chain actors to convince the government to reorient future *Initiative Riz* subsidies for equipment and mini rice mills for farmer organizations. Instead, the government should support costs related to the participation of farmer organizations in value chain alliances with mini rice mills and wholesalers/importers to supply higher-quality paddy. Such subsidies could be used primarily to cover costs of building warehouses and equipment to store paddy in good conditions.
- Working to promote voluntary market standards and an eventual Mali brand name for the highest-quality rice. Currently individual wholesalers or mini rice mills focusing on quality improvements will try to impose their own brand names as a unique mark of quality. While this lack of a standard vocabulary may cause some minor problems in the local market, it is a more serious obstacle to establishing brand recognition for Malian rice in foreign markets. To combat this, the GOM and the industry should investigate the feasibility of establishing an export brand name (such as "Mali Long-Grain Gambiaka") and agree to set minimum quality standards.
- Negotiating special agreement frameworks within the ON zone—in a similar manner to what the MCC has done in the Alatona—to allow for temporary experimental incentives for both the ON and farmers to respect obligations for secondary and tertiary canal maintenance. These should be applied in pilot areas defined by agreements between farmer organizations and private millers or investors.

### UPGRADING TRAJECTORY

The suggested strategy presented above includes highly controversial measures—particularly limiting or even eliminating the use of import exonerations and reoriented subsidies to farmer groups so that they no longer crowd out private investment. These measures are all the more difficult to implement since there is no consensus among the main actors involved that they are even desirable. To increase the likelihood that the strategy will be supported, it would be desirable for USAID to organize one or more rice value chain forums organized around a unifying theme or themes that can be used to stimulate reflection among key value chain stakeholders and create some level of consensus. The theme with the most immediate potential for creating consensus around needed actions would be "how to turn Mali into a consistent rice exporter." This is a theme that would bring together both private-sector actors and farmers and is fully consistent with the directions announced in the GOM's *Initiative Riz*. This initial consensus-building exercise should also jump-start the process of identifying the key stakeholders to participate in value chain alliances based on improved quality and, even more importantly, facilitating conversation among them.

After this initial phase of consultation, USAID will need to be prepared to commence support for implementation of the strategy. The most critical components of this initial support are listed below under each axis.

#### AXIS ONE: SUPPORTING PRODUCTION

- Selection of zones of intervention and preparation of needed water infrastructure investment plans (if any)
- Deciding on the attribution of roles with GOM and other donors (if any) active in the zones of intervention
- Beginning the process of vetting and preparing/forming partner farmer organizations

#### AXIS TWO: SUPPORTING IMPROVED QUALITY

Critical initial threshold actions that must take place for the strategy to achieve its objectives under this Axis include:

• Establishment of one or more viable pilot projects implicating both private-sector actors (probably mini rice mills, wholesaler/importers, or new investors altogether) and farmer organizations in the ON based on new private investments in improved processing technology

• Planning for post-harvest improvements and identifying investment requirements and a strategy for financing them with potential participation from private-sector partners, farmer organizations, the GOM and USAID

#### AXIS THREE: ADDRESSING BUSINESS ENABLING ENVIRONMENT CONSTRAINTS

- Formulation of a consensus between value chain actors and the GOM on the main elements of a plan to develop Mali's capacity to export rice, with a focus on higher quality
- Commitment on the part of the GOM to reduce the magnitude of import exonerations and set a predictable, stable level of protection

## I. INTRODUCTION TO THE RICE INDUSTRY IN MALI

Rice is a crop of strategic importance for Mali. It is grown in every region of the country and is increasingly favored by consumers—primarily in urban zones but also in the rural areas where it is grown. Rice is, in many ways, the success story of Malian agriculture over the last two decades. Production and yields have been rising steadily over this time, particularly since the devaluation of the CFA franc. Over the period of 1980 to 2004, total value added from rice production rose by an average of 9.3 percent per year—the highest increase for any agricultural crop. It now accounts for 12.3 percent of agricultural value added (up from 4.3 percent in the 1980s).<sup>1</sup> This success has been fueled mainly by public-led investments in large-scale, gravity-fed irrigation infrastructure in the main producing zone of the Office du Niger (ON) and by an improvement in the enabling environment with a progressive withdrawal of the state from rice marketing.<sup>2</sup> This success is all the more impressive in that it breaks with trends towards decreasing productivity in other cereal crops.<sup>3</sup>

The overall trend in production and imports for the last seven years is shown below in Table 1. The favorable evolution of rice production has been driven both by an increase in planted areas in the core ON zone and by an increase of average yields of 20 percent over the period 1999 to 2008.<sup>4</sup> Yield increases are due to farmer adoption of improved production practices—mainly transplanting (*repiquage*) of seedlings instead of broadcast sowing and increased use of fertilizer due to the improvement in production credit availability during the last four to five years. Food aid flows in rice are insignificant—reaching a maximum of 13,000 tons in 2005 to 2006 and varying between zero and 6,000 tons since 2000 to 2001. Exports, as well, are negligible with only small quantities being exported in cross-border trade to Mauritania and Guinea.<sup>5</sup>

	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Production (tons)	415,921	562,930	430,850	567,495	631,941	649,429	964,585
Imports (tons)	202,814	186,675	105,390	272,371	180,208	137,142	165,716
Self Sufficiency Ratio	67%	75%	80%	67%	78%	83%	85%

#### Table I: Rice Production and Imports (Hulled Rice)<sup>6</sup>

Source : DNSI

<sup>&</sup>lt;sup>1</sup> Value added is the difference between the value of a sector's output and its inputs from other sectors. It is an accurate measure of a given activity or sector's contribution to GDP—correcting for double counting due to inputs purchased from other sectors.

<sup>&</sup>lt;sup>2</sup> The Office du Niger is one of three parapublic organizations that exist in Mali to manage and maintain irrigation systems in which the state has made significant infrastructure investments. (The others are the Office Riz Segou and Office Riz Mopti.) Since each of these "Offices" is responsible for a very specific geographical area, it is common to use them as a geographical descriptor as in "ON lands."

<sup>&</sup>lt;sup>3</sup> This section draws heavily from John Staatz and Valerie Kelly, "Mali Country Economic Memorandum: Agriculture and Rural Development" Michigan, United States: Michigan State University Department of Agricultural Economics, 2006.

<sup>&</sup>lt;sup>4</sup> The extremely high production figures in 2008/09 are disputed as they are based on assumptions of maximum yields from first-time seed distributions under the Malian government's new *Initiative Riz* program of support to the rice sector. Even so, knowledgeable observers agree that record production levels were observed in 2008/09 and that annual production of hulled rice was probably around 750,000 MT.

<sup>&</sup>lt;sup>5</sup> OMA figures show a total of 282 tons of local rice was exported in 2007/08 to Mauritania followed by 250 tons in 2008/09 to both Mauritania and Guinea.

Rice production in Mali is based on a variety of productive systems that exhibit significant differences. The six main types of production systems are:

- Large-scale, gravity-fed systems in the ON zone and much smaller systems around the Baguinéda and Selingué dams
- Small-scale village systems irrigated by diesel pumps that raise water from the Niger River. These systems, called "irrigated village perimeters," are located mainly in the Timbuktu and Mopti Regions
- Controlled flooding systems where rising river water is channeled to fill a flood plain and the release and drainage is controlled to prolong the season and avoid flood damage. These systems are most prevalent around Mopti and Segou
- Traditional uncontrolled planting on riverside flood plains in the same zones where controlled flooding is practiced
- Rainfed rice cultivation with small-scale water retention structures in lowlands (*bas fonds*) to enhance natural land contours and permit the controlled use of surface water. These systems are based in the Southern cotton belt
- Rainfed rice on upland areas having rainfall in excess of 800 to 1,100 mm/year. The largest concentration of this type of production is also in the cotton belt in the Sikasso Region with additional areas in the Kayes and Koulikoro Regions

The locations of the different systems are shown in Figure 1.

Table 2 provides an overview of the major characteristics of each of these systems. As is clear, the major locus of rice production in Mali is the large-scale, gravity-fed systems—and in particular the Office du Niger zone. It is generally accepted that the ON accounts for just over half of national production and a much larger share of marketed surpluses after household consumption. Farm sizes are the largest in the uncontrolled flood plain system, which is a low input/low yield system characterized by infrequent use of improved technology. Farm sizes are also fairly large in controlled flooding systems, which can cover large areas depending on the scale of the infrastructure investment. After the flood-based systems, farm sizes tend to be largest in the Office du Niger, although they are decreasing due to divisions of plots through generational transmissions.

<sup>&</sup>lt;sup>6</sup> Mali's rice production figures are given in unhulled (paddy) rice. The figures in Table 1 are for hulled rice calculated with a 60 percent yield of hulled rice from paddy. Import statistics are in hulled rice ready for consumption.

Figure 1: Location of Major Production Systems and Rice Flows



Source: FEWSNET and Ministry of Agriculture

### Table 2: Major Productive Systems

Productive System	Geographic Zone	Current Areas	Current Production Estimates (paddy)	Average Farm Size	Potential for Expansion	Yields with Improved Methods (paddy)	Non- Improved Yields (paddy)	Cost of Production (CFA/kg)	Estimated Cost of Water Infrastructure Construction
Large-Scale Gravity-Fed Systems	ON/Segou, Baguinéda, Selingué	90,000 ha	405,000 MT	I-2 ha	900,000 ha	6 to 10 MT/ha	2 to 3.5 MT/ha	130 CFA/kg	3 to 3.5 Million CFA/ha
Small-Scale Village Irrigated Perimeters	Timbuktu, Mopti	3,300 ha	19,800 MT	0.3 ha	30,000 ha	6 to 7 MT/ha	0 to 5 MT/ha	159 CFA/kg	700,000 to I Million CFA/ha
Controlled Flooding	Mopti, Segou	75,000 ha	111,000 MT	2.5 – 10 ha	150,000 to 300,000 ha	2 - 3 MT/ha	0.8 MT/ha	192 CFA/kg	50,000 to 1.6 Million CFA/ha
Uncontrolled Plain Flooding	Mopti	150,000 to 300,000 ha	225,000 MT	10 ha		I.2 MT/ha	0.8 MT/ha	181 CFA/kg	
Rainfed Systems with Small-Scale Water Retention Structures ("bas fonds")	Sikasso, Cotton Zone	5,000 ha	10,000 MT	Less than 0.5 ha	300,000	3 MT/ha	0.8 MT/ha	96 CFA/kg	600,000 CFA/ha
Rainfed upland Systems	Sikasso, Cotton Zone	14,000 ha	28,000 MT	Less than 0.5 ha	300,000 ha to 800,000 ha	2 to 3 MT/ha	0.8 MT/ha	130 CFA/kg	

Sources : IFPRI/Harvest Choice ; ON Rapports de Campagne ; Lamissa Diakité, "Note technique sur la filière riz au Mali," 2009; Lansana Touré, Problématique de la maitrise de l'eau pour l'agriculture, Génie Rurale; GTZ/Programme Mali Nord pour le développent de la petite irrigation; L'irrigation en chiffres, FAO; team estimates for production.

The 1 to 2 hectare size reported in Table 2 is for family farms (*exploitations familiales*) in the ON, and excludes the larger commercial farms. If these are included, the overall average farm size increases to around five hectares.<sup>7</sup> Areas devoted to rice in all other systems are well under one hectare. The sharp contrast between total production volumes and farm sizes in the different production systems make it clear that they can be divided into three broad categories:

- 1. The ON region, which is characterized by farmers with larger family-based plots cultivating in a low-risk environment with a clear commercial strategy. They produce two crops a year: only rice in the main season and a mix of rice and shallots or onions in the off-season.
- 2. Family farms on large flood plains with or without water control infrastructure that also produce large volumes that implicate a commercial objective, but with a much higher production risk than in the ON due to a lower degree of water control.
- 3. Rice farmers elsewhere who tend to have small areas devoted to rice within a context of a more diversified cropping mix. For this last category, although there may be marketed surpluses, the objective of maximizing cash sales revenue from rice is a secondary concern as rice is first and foremost produced to meet household consumption objectives.

The central role of the Segou region, which includes both the ON lands and the adjacent smaller Office Riz Segou (ORS) zone of controlled flooding parcels, can be seen in the table presented in Annex A. Segou alone supplies 87 percent of the total supply of rice available for trade outside the region of production after local consumption needs have been met. In most of the other zones, rice tends to remain in nearby local markets. Thus the vast majority of rice traded over significant distances comes from the core ON/ORS zone. This zone is the most advanced rice-producing area as it generally has larger farms and a much higher adoption rate among family farms of improved technologies, including certified seeds, fertilizers and transplanting practices. As shown below in the section on value chain actors, it has also been the locus of private microentrepreneur investments in mobile rice hullers. Lastly, because of the large number of hectares under total water control, Segou is the only region in Mali that can be counted on at present to produce a sizeable surplus in drought years when production drops precipitously in controlled flooding and rainfed systems.

The Sikasso and Timbuktu regions are also average surplus producers, albeit with much smaller volumes than Segou. Because of a lower degree of water control, production in these zones is also more variable, with Timbuktu exhibiting deficits in two of the past six years and Sikasso with one deficit in that time period. Each of these regions has the potential to become regular producers of surpluses with further investments in production. The small size of family farms in the rainfed and irrigated village perimeter systems that are characteristic of these zones also presents an important challenge to increasing rice production since farmers have less ability to finance investments (compared to farmers in the ON) and require higher levels of assistance in production and farmer organization strengthening to facilitate access to credit and inputs.

The Mopti zone is also an occasional producer of significant surpluses in years of favorable rainfall, due to the presence of large areas of rice production under uncontrolled and controlled flooding systems. The potential for increasing production in this zone is linked to the availability of funding for infrastructure investments and farmer extension to transfer areas using uncontrolled to controlled flooding methods through improved planting techniques based on appropriate varieties and inputs.

<sup>&</sup>lt;sup>7</sup> The average rice farm size in the Segou Province reported by Diakhité in "Note technique sur la filière riz," 2009 was 4.7 hectares. This includes commercial farms in the ON.

Data on household consumption in Mali is of doubtful reliability. Official figures show that per capita consumption increased from 34 kg per person in 1989 to 53 kg per person in 1998 and to an estimated 57 kg per person in 2007.<sup>8</sup> Combining these figures with production statistics leads to the surprising conclusion that Mali is self-sufficient in rice production. This is reflected by the six-year average annual surplus of just under 200,000 MT in Annex A. This conclusion is difficult to reconcile with the import statistics from Table 1 that show a recurring rice deficit, with imports providing 15 percent to 33 percent of total market purchases. It is most likely that the official estimates of household consumption have not kept pace with changing food consumption preferences, which most observers believe have seen a significant switch to rice over millet and sorghum. Using official production and import volumes from Table 1 as the basis for calculating consumption (and assuming no change in stocks or exports) would imply that consumption is now around 94 kg per person. This is no doubt closer to the truth than the widely cited official estimates.

Given the doubt surrounding consumption patterns, poverty models showing the effect of changes in rice production and prices are also somewhat dubious. Still, estimates from a Social Accounting Matrix study in 2008 show that about 90 percent of households consume rice and that aggregate household consumption is about twice the amount of household income that is derived from rice production. In this context, price increases in rice tend to have a significant effect on overall poverty rates, with a 25 percent increase in the price of rice leading to an increase of 1.5 percent in the rate of poverty. Since retail price increases dating from the 2007 to 2008 season have largely exceeded this threshold, one can safely assume that rising rice prices have contributed to rising poverty levels.<sup>9</sup>

Gender also plays an important part in the distribution of gains from rice farming. In most productive systems, revenue from rice is generally controlled by the head of the household who is responsible for marketing decisions. In Mali, this person is usually male. The only exception to this is in the Southern rainfed zone around Sikasso where lowland rice is mainly cultivated and marketed by women.<sup>10</sup> Since rice in this zone is a relatively small part of most family's cropping mix, it is not clear that, with an expansion of areas planted, rice would necessarily remain under the control of women. In addition, in the ON zone, where most families hire outside labor to complete the more labor-intensive steps of rice production, many of these tasks are habitually completed by women. These include transplanting of seedlings and the assembly and stacking of harvested rice stalks in the field for drying. These tasks comprise 31 percent of total cash outlays for labor or 9 percent of the total cost of production.

<sup>&</sup>lt;sup>8</sup> The 1989 and 1998 figures are based on household survey data from the DNSI. The 2007 figure is an estimate from the CPS/MA. These are reported in Lamissa Diakité, "Note technique sur la filière riz au Mali", 2009.

<sup>9</sup> Nouve, Kofi and Quentin Woods. "Impact of Rising Rice Prices and Policy Responses in Mali"

<sup>&</sup>lt;sup>10</sup> One possible indication of the degree of importance of women's participation in the various systems can be found in the sample survey that was used to evaluate the 2008/09 Initative Riz. With a survey instrument directed at the household member responsible for rice cultivation, the survey included women in its sample at the following rates: 6 percent for large-scale gravity systems; 6 percent for flood-based systems (controlled and non-controlled); 26 percent for upland rainfed rice; and 47percent for bas fonds rainfed rice. See Ministre de l'Agriculture, Bilan de l'Initiative Riz: champagne 2008-2009.

# II. BUSINESS ENABLING ENVIRONMENT

### NATIONAL LEVEL

The legacy of heavy state intervention in the rice value chain can still be felt in Mali. This is particularly true in the ON zone, where the ON held a monopoly on marketing until the mid 1980s and fixed paddy prices into the early 1990s. Market liberalization of cereals in the 1990s brought in free contracting between private buyers and farmers, either individually or through village associations. At the same time, the ON progressively withdrew from input supply, harvest and post-harvest services and storage. By the mid 2000's the ON was basically limited to providing extension services and managing water access and canal maintenance.

The liberalization process, coupled with the devaluation of the CFA franc has been critical to improving the returns to farmers in the ON zone—with a 600 percent increase in real incomes between 1989 and 1998.<sup>11</sup> But this history contained many "hiccups" concerning private-sector involvement in the value chain. These historical incidents have left many farmers and public authorities with an underlying mistrust of market mechanisms and the private sector. Specific cases often cited include:

- 3 billion CFA in bad debt from the 1991 to 1992 campaign when the ON contracted with a private buyer to buy rice on the basis of a false letter of guarantee
- 2 billion CFA in bad debt from 1993 to 1994 contracted by village associations in the first liberalized campaign when private buyers reneged on payment after taking control of stocks (and then largely disappeared)
- Widespread problems with private input supplier contract performance during the first years of liberalized input supply after 1994, which further contributed to widespread village association defaults for input supply loans contracted under the sector liberalization strategy.<sup>12</sup>

As a result of this peculiar history, there is persistent mistrust between actors at different levels of the value chain. This factor is an important underlying brake on increased vertical coordination and also provides motivation for politicians to become involved in commercial or economic negotiations in the name of protecting the farmers.

Adding to this general history of mistrust are other specific enabling environment factors affecting the rice value chain. These are listed below.

### PUBLIC SUBSIDIES AND IMPORT EXONERATIONS

The prevailing structure of protection in Union Economique et Monétaire Ouest Africain (UEMOA) countries, of which Mali is a member, calls for a common 10 percent tariff on rice while allowing each country to set its VAT rates. Taking the Malian VAT rate of 18 percent along with other customs duties, the "normal" level of protection for

<sup>&</sup>lt;sup>11</sup> See Aw, "Making Large Scale Irrigation Systems Work: Reforms at Mali's Office du Niger."

<sup>&</sup>lt;sup>12</sup> Many observers contend that this problem has not totally disappeared.

domestic rice producers is 32 percent.<sup>13</sup> After low production in the 2004 to 2005 season led to substantial price hikes, pressure built on the Malian government to intervene to lower rice prices. In this context, exceptional VAT exonerations for imported rice were adopted from 2005 to 2006. Another increase in local rice prices during the 2007 to 2008 season created additional pressure, leading the Government of Mali (GOM) to renew the VAT exoneration and adopt new import tariff exonerations on rice imports as shown below in Table 3 (see Annex B for price series data on rice.)

	2005-06	2006-07	2007-08	2008-09
Subsidies for Rice Production	None	None	None	\$US 23 million (85% for fertilizer and rest for equipment, seeds and extension)
VAT Exonerations for Imports	Import of 201,194 MT with VAT exonerations	None	Import of 5,504 MT with VAT exonerations	Import of 105,789 MT with VAT exonerations
Tariff and Customs Duties Exemptions	None	None	Exoneration from all customs duties and tariffs	Exoneration from all customs duties and tariffs
Measures for Rice Imports	None	None	Price fixed for exonerated rice at: 300 CFA/kg wholesale 310 CFA/kg retail	Price fixed for exonerated rice at: 280 CFA/kg wholesale 300 CFA/kg retail
Other Measures	None	None	Prohibition on export and re-export of all food products	None

#### Table 3: Policy Interventions affecting the rice value chain

Source: DNSI and Team research

As nearly two-thirds of all rice imports were covered by these measures between 2005 to 2006 and 2008 to 2009, the net impact of these exonerations on rice value chain actors is significant. Imports of exonerated rice are limited to specified low-grades containing a mix of broken and whole grains that are supplied from stocks of Asian rice held in coastal cities in the West African sub-region. The subsidies for rice production are a more recent phenomenon, linked to the GOM's Rice Initiative of 2008 to 2009 that is discussed below.

### THE GOM'S 'INITIATIVE RIZ'

With the aim of lowering consumer prices, the Malian government, led by the Prime Minister's office, has embarked on a high profile rice promotion campaign (referred to as the "*Initiative Riz*" in French). The plan has three main axes: (1) the extension of irrigated areas with the GOM actively soliciting financing to bring new areas under irrigation including both gravity-fed ON lands and pump-fed irrigated village perimeters; (2) the rapid expansion of upland rainfed rice led by the introduction of the drought-resistant Nerica 4 variety; and (3) the intensification and expansion of controlled flooding systems. In the first year of the program, emphasis was placed on the distribution of Nerica 4

<sup>&</sup>lt;sup>13</sup> Most of this protection afforded domestic rice producers comes from the non-application of the VAT to domestic food stuffs. The structure of protection is described in Diarra, "Analyse des déterminants de la compétitivité du riz de l'Office du Niger sur les marchés nationaux et sous régionaux."

seeds in the Sikasso, Kayes and Koulikoro Regions; on the supply of subsidized fertilizer in all the major zones of production; and on the supply of subsidized equipment for production and processing. The \$23 million in subsidies in Table 3 represent the first year's tranche of production subsidies included in the initiative's budget. Financing has been provided mainly by Canada, the Netherlands and the African Development Bank. The GOM has recently announced the extension of the program into the 2009 to 2010 campaign. The *Initiative Riz* has come under some criticism since it has so far proved unsuccessful in lowering prices for local rice, despite the very high reported level of national production between 2008 and 2009 (see Annex B). The announced level of production, at 1.6 million tons of paddy, represents an all-time high for Mali, even with a discount factor to correct for what many observers consider to be overly optimistic production statistics. Technical criticisms of the *Initiative Riz*'s first year center on the: (a) hasty distribution of untested Nerica 4 seeds with little prior extension advice to farmers or even confirmation of the suitability of the new variety to prevailing agro-climactic conditions; (b) the distorting impact of subsidized fertilizer distributions on existing input supply and financing arrangements; and (c) the excessive focus on rice to the exclusion of other cereals—particularly when farmers in the main rice areas of the ON are considered to be relatively wealthy.

### FOOD SECURITY STOCKS

Although the public sector no longer has a role in the marketing of agricultural products, the Malian government is aiming to constitute a regulating reserve stock of 100,000 tons of cereals, of which 20,000 tons are now held in rice. At present, this rice stock is managed by the Office des Produits Agricoles de Mali (OPAM), the former agricultural products marketing agency. OPAM's rice stock is constituted mainly from imported rice and food aid provided by Japan. As part of the government's *Initiative Riz*, OPAM also sought to purchase 46,000 tons of Malian rice in the spring of 2009 with the aim of releasing this rice into the market to lower consumer prices. Negotiations were held between the government, OPAM and farmer organizations within the framework of the national Assemblée Permanente des Chambres d'Agriculture du Mali (APCAM). These discussions resulted in a price set at 250 CFA/kg at a time when collectors were paying 290 CFA/kg for rice in the ON zone and wholesalers and semi-wholesalers were often paying above 300 CFA/kg. As a result, OPAM was able to buy only 121 tons of local rice.

### LOCAL LEVEL

### ENABLING ENVIRONMENT ISSUES LINKED TO THE OFFICE DU NIGER

Relations between the Office du Niger and many farmers and farmer organizations in its zone of intervention are generally poor. While the ON has withdrawn from all harvesting and marketing functions, it is the critical actor for water access and fertilizer supply—despite a formal transfer of responsibility to farmer organizations. It remains a key player in the enabling environment and has the authority to decide policy on issues related to land titling and land rights for irrigated plots. The main areas in which the ON intervenes are described below.

Attribution of irrigated parcels and land rights. The ON is responsible for the allocation of irrigated parcels to users in the zone. With the exception of a special derogation for the MCC/MCA Alatona zone whereby farmers will be able to obtain actual land titles, final land ownership rests with the state and the ON as its agent. In practice, most land is held by family farms under two types of arrangements: annually renewable farming leases that are not transmittable and "farming permits" that are transmittable. Farmers with a history of maintaining annual leases are generally able to transform these into farming permits. Virtually all family farms are held under one of these two arrangements. Other types of longer-term lease holdings are intended to attract commercial SME investors who will construct new irrigation canals in return for longer-term occupation rights granted as a reward for investment. However, little private investment has materialized and these long-term lease mechanisms have not generated as much investment as expected. All the above types of land holdings can be and are commonly revoked by the ON if farmers

fail to pay the annual water user fee (*redevance*) that is meant to finance ON-contracted work to maintain irrigation infrastructure. In these cases, the ON evicts farm families. The result is that rates of water user fee payment are quite high—usually above 95 percent. Because of annual evictions and new lands being brought under irrigation, each year the ON is able to offer a number of new farms to applicants. By all accounts the demand for new parcels in the ON vastly outstrips the supply, resulting in inevitable accusations of favoritism and non-transparency in the attribution of new parcels.

**Irrigation canal maintenance.** A 2007 evaluation of the ON found rates of compliance with maintenance objectives of 31 percent for farmers, 45 percent for the ON and 70 percent for the state.<sup>14</sup> As a result, the system is characterized by a high degree of water loss and inadequate drainage, which is a serious problem for farmers in many parts of the ON. None of the three parties responsible for canal maintenance respects their contractual commitments, with the worst performers being the farmers.

Access to fertilizer and input financing. While the ON has no formal role in financing input supply, its field staff do play a key role by approving annual fertilizer budgets of farmer organizations that are in good standing with the Banque Nationale de Développement Agricole (BNDA) and local Microfinance Institution (MFI) retailers.<sup>15</sup> These budgets are grouped into an annual bid for fertilizer that is organized by the ON and supervised by a joint committee with farmer representatives and the Chambre Régional d'Agriculture (CRA). After attribution of the supply contracts to winning bidders, selected fertilizer supply companies deliver fertilizer directly to farmer organizations that issue receipts authorizing payment to the companies from the lending MFIs with refinancing from the BNDA. Farmer organizations then receive paddy from farmers, which they process into milled rice to pay back the loans. Although the ON has a very limited role in the financing or physical delivery of fertilizer, it still plays a key role in supervising the centralized bidding process and in giving approval for farmer organizations' budgets before they can be presented to the lenders. This generates some tensions between farmers and the responsible ON agents.<sup>16</sup>

<sup>&</sup>lt;sup>14</sup> "Evaluation du Contrat plan 2005-2007, Etat-Office du Niger-Exploitants Agricoles."

<sup>&</sup>lt;sup>15</sup> The BNDA is a registered commercial bank owned by the State.

<sup>&</sup>lt;sup>16</sup> An audit of the ON conducted in 2007 speaks of farmers resenting the control function of ON extension agents.

# III. END MARKETS

There is little doubt about the strong underlying demand for rice. Despite the regular and constant growth in production, imports have not diminished and prices for local rice continue to be quite high (as shown in Annex B). Salient characteristics of the end markets for rice are that:

There is a clear preference for Malian over imported rice at similar levels of quality. There is a persistent pattern for Malian rice to retail at prices that are significantly higher than imported rice of roughly comparable physical quality. Virtually all value chain studies produced over the last five years claim that Malian consumers prefer the taste of local rice. Although small quantities of high-quality imported rice (largely aromatic Asian long-grain varieties that have taste profiles that are quite similar to superior grades of irrigated Malian rice) are present in the small supermarket segment, the overwhelming market positioning of imported rice in Mali is in the lower price market segments—in both broken and unbroken forms. Consumers widely proclaim that imported rice—particularly brokens—may gain more volume when cooked (which is seen as a positive factor for big families and consumers preparing celebrations), but that its taste characteristics are vastly inferior to local rice.

There is a lack of a common vocabulary governing quality and varieties. When traders and consumers are asked what type of rice they prize most, they will most often say "Gambiaka," which technically is a Gambiaka suruni or Kogoni 91-1, a new variety of disease-resistant rice introduced in irrigated areas in the 1990s that has become the most widespread variety produced in the ON. However, much of the rice that is called "Gambiaka" is actually a mix of over a dozen other varieties and most traders, let alone consumers, are unaware of the precise agronomic definition and are unable to differentiate between the different irrigated varieties. Thus the name "Gambiaka," as commonly used, means nothing more than irrigated rice from Mali-most often grown under total water control conditions. Further complicating this is the lack of standard grading systems for rice. The old classification system dating from the 1980s, when the ON processed and marketed rice itself, still has some name recognition, but is far from universally followed. This system divided rice into three main classifications: RM-40 or unsorted rice with broken grains not exceeding 40 percent; ELB or "extra-long blanchi" for polished extra-long rice with a percentage of brokens not exceeding 5 percent; and broken rice with grains of homogenous sizes. Today, rice is still sold in these general categories, but there is little attempt to maintain rigorous sorting. Rice sold in the market often has a wide variation of the rate of broken grains, meaning that consumers must inspect each purchase individually since there are no standard labels that can attest to product quality or homogeneity. Another difficulty is that much local rice contains significant levels of impurities, such as pebbles, bran, straw and rice flour that are a result of poor-quality paddy and processing deficiencies.

A clear hierarchy of preference can be established between different grades and types of rice. Using June 2009 retail prices (from highest to lowest) as a guide for market preferences, retail prices in Bamako indicate that the most common types of rice in the market are as follows:

- Homogenous, clean, well-sorted local rice in either broken or extra-long form with no more than 5 percent of non-standard grains. Brokens may be divided into fine and coarse mixes (425 to 450 CFA/kg)
- Homogenous, clean, broken imported rice (400 to 450 CFA/kg)
- Clean local rice that has no impurities, may be polished, but is not well-sorted and has a significant mix of broken and whole grains (400 CFA/kg)
- Standard grade local rice that includes some impurities and is not sorted or polished (375 CFA/kg)
- Non-homogenous imported rice with a mix of broken and whole grains or homogenous lots with some defects (300 to 325 CFA/kg)<sup>17</sup>

<sup>&</sup>lt;sup>17</sup> Some imported rice now on the market includes a small percentage of parboiled grains in a larger non-parboiled grain base. GLOBAL FOOD SECURITY RESPONSE MALL RICE STUDY

# IV. CHAIN ANALYSIS

## **STRUCTURE OF THE RICE VALUE CHAIN**

The rice value chain map is shown below in Figure 2. It represents the marketable surplus of milled rice produced in the Segou region after farmer household consumption. Total volumes and prices are based on the 2008/09 main production season using official production estimates and the interviews conducted by the research teams. Volumes in different branches are based on estimates of reported volumes by value chain actors where available. Many of the volumes in Figure 2 could not be verified, but the exact numbers are less important than the aggregate magnitudes, which the team believes are a good, if inexact, representation of reality that could be improved with further research.

The end markets at the top of the map include two spatially distinct locations. The regional consumption market is represented on the left. This comprises the ensemble of urban and rural markets in the production regions—mainly Segou, but also the regional weekly markets in towns of the ON and ORS zones. The two rectangles on the right represent the national market consumer, located mainly in Bamako, although rice from the Segou region does indeed travel all over Mali.

All rice is produced either by small family farms or by larger farms operating under the ON's long-term lease regime. Rice can either be sold as paddy (red arrows) before hulling or as milled rice (blue arrows). Family farms generally pay for hulling as a contracted service provided by many of the mobile diesel powered hullers on-farm for a fee (750 CFA/sack of paddy or 14 CFA/kg of hulled rice) or they take their paddy to a stationary huller that may offer better performance (*"minirizerie"* in French or *"mini rice mill"* in English) or a farmer organization that has hullers. The dotted rectangle on the left rising from the family farm rectangle represents sales of hulled rice from small farmers that they have processed through a mobile huller or a mini rice mill.

Major actors in the map include:

**Small family farmers.** These are either traditional smallholders on ON lands with annual farming leases or farming permits, or any of the smallholders in the ORS zone. Firm data on the size distribution of family farms is scarce. In 2007/08 the ON reallocated parcels to 2,077 households with an average of 2.7 hectares per farm.<sup>18</sup> According to the farmer group apex union Faranfasi So, two-thirds of family farms are under 3 hectares—a level which ON technicians cite as a rough threshold for ensuring financial viability. Many farms have been subdivided due to generational transmissions, which results in the widespread problem that in many cases farm size is too small to be viable—and it is these farms that have difficulty paying their water user fees to the ON. The level of mechanization is quite low, with farmers generally paying SME service providers or farmer organizations for harvesting, threshing and rice milling.

<sup>&</sup>lt;sup>18</sup> ON, Rapport de campagne 2007/08.



#### Figure 2: Rice Value Chain Map—Segou Region , 2008/09 Campaign

\*\*\* price based on 2007 average declared value

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**Commercial farms.** These are farms that operate in the ON zone through the special 30- or 50-year lease arrangements, which were designed to attract business-oriented farmers. Farm size for this type of occupant ranges from 5 hectares to over 100 hectares. The larger farmers in this category possess harvesting and hulling equipment, so they generally sell milled rice directly to semi-wholesalers or urban consumers.

**Farmer organizations.** The term "farmer organization" embraces a number of different types of entities in the ON lands. Primary-level farmer organizations include Village Associations, which have a politico-administrative role as the lowest level of territorial administration; more loosely defined farmer groups formed under non-profit association statutes; and increasingly, cooperatives. All three types of groups play a role in regrouping farmers for various purposes, including: accessing credit from financial institutions; providing grouped orders of fertilizer and seeds; providing harvest and post-harvest services; and marketing.

Second-level apex organizations in the ON zone include the Canadian International Development Agency (CIDA)supported Faso Jigi union, which regroups 58 primary organizations, provides collective storage and marketing services and facilitates credit through a guarantee program with the BNDA. Another apex group, Faranfasi So, regroups 77 primary groups (including many members of Faso Jigi). Faranfasi So does not intervene in rice marketing, storage or financing itself, but provides institutional support to farmer organizations by assisting with agricultural extension, governance and access to credit. Faranfasi So has received support under a project from the Agence Fançaise de Developpement (AFD). Other smaller apex organizations in the ON zone include SEXAGON and Jèkaféré, which both seek to help members with marketing and institutional development. Of the second-level groups, only Faso Jigi has established itself as a major participant in marketing rice.<sup>19</sup>

**Mini rice mills** provide hulling services to farmers in a fashion similar to the small portable hullers. The difference vis-à-vis mobile hullers is mini rice mills use superior milling technology, which offers the potential for improved performance in terms of loss rates with the potential to achieve up to 72 percent in net yield (if paddy quality is perfect) with a standard average of around 60-62 percent. In contrast, mobile hullers usually operate in the 50-60 percent range and often inflict damage on the hulled product. Mini rice mills also provide superior performance in terms of eliminating impurities from the final product. They may also operate with polishers and graders capable of presenting a polished product and sorting it into homogenous lots by grain size. In contrast to the portable huller operators, mini rice mills not only provide a service for a fee to farmers by milling paddy, but they also actually purchase paddy or hulled rice, which they run through their equipment to sell as their own product. In terms of markets, they either sell at small volumes to retailers or directly to high-end consumers, or they try to sell at higher volumes and lower margins to semi-wholesalers or wholesalers. At least two private SME mini rice mills were introduced to the ON region under the USAID Center for Agro-Enterprise project (CAE) in the early 2000s and are still operating. Investment costs range from \$4,000 to \$5,000 for a simple electric Chinese model that can process up to 10 tons in 8 hours with a polisher but no size grader, to over \$50,000 for the most expensive locally produced model with a continuous flow production line and size grader.

**Collectors.** Small-scale traders or collectors purchase rice either at the farm or in local weekly markets in the major production zones and then transport rice to major market centers. They play a critical role of assembly and spatial arbitrage. Collectors may be independent traders or agents for higher-level buyers (mainly wholesaler/importers and semi-wholesalers) who can furnish them with cash advances. They may also sell directly to retailers or even act as retailers themselves in smaller urban markets.

Wholesaler/importers. Wholesaler/importers are the actors with the most financial and business capacity in the rice value chain. There are seven to ten actors at this level who occasionally import rice and trade in locally produced rice,

<sup>&</sup>lt;sup>19</sup> Faso Jigi, however, is experiencing serious problems in this regard, as discussed below.

but the greatest volumes at this level are dealt by only three operators. These three are GDCM/Moulin Moderne, Groupe AMI/Grand Moulin du Mali and Grand Grenier du Bonheur (GGB). These three actors are diversified cereals traders with several business entities who deal in other cereals and also have industrial wheat flour mills. Of the four industrial rice mills that were privatized during the late 1990s, one is owed by GGB and the remaining three by the Société des Exploitations des Rizeries du Mali (SERIMA). None of these are currently functioning.<sup>20</sup> GDCM-SA and Groupe AMI, however, have invested in new equipment to hull and process rice on a much smaller scale. To operate at this level, significant capital is required to furnish stocks and organize transport, as each wholesaler/importer maintains a fleet of their own trucks that import rice and wheat from Abidjan, Tema or Conakry.<sup>21</sup> For these actors, local rice is somewhat of a sideline—as their main business is furnishing milled wheat flour and other cereals through a distribution network of dealers and representative stores throughout Mali. In this context, their finance, transport and storage facilities allow them to augment their throughput by adding imported rice to their mix and, on a smaller scale, local rice when the margins are more attractive relative to imported rice.

**Semi-wholesalers.** These are the main clients of the travelling collectors who bring rice to the major urban areas. They are usually located in warehouses in proximity to the major urban markets. They also purchase imported rice from wholesalers/importers. Semi-wholesalers do not generally travel themselves, but stay close to their retailer clients to whom they sell in quantities of no less than one sack. They generally do not function with formal credit as they prefer operating on a system that offers payment flexibility of several days with both retailers and suppliers. Personal relationships and continual market presence close to retailers provide a high degree of security for any credit extended.

**Market retailers/sorters.** One of the new developments in the rice value chain over the last five years is the emergence of a new category of retailers who specialize in hand-sorted, cleaned Malian rice. The major locus for this is the market across from the Grand Mosque in Bamako. These retailers buy directly from collectors and hand sort non-homogenous sacks of rice to produce pure extra-long, large-grain and small-grain broken rice for sale by the kilogram or by sack. These actors differ from most retails in that they are continually sorting rice, rather than only sorting on order, as most retailers do.

**Retailers.** Most rice retailers are installed in open-air markets or in neighboring store fronts. These retailers either buy from collectors arriving directly from the country or from semi-wholesalers in Bamako. Local and imported rice are also marketed in small quantities in Bamako neighborhood grocery stores, which are referred to as "alimentations" and frequented principally by wealthier consumers.

The structure of the value chain is somewhat concentrated at the top, as the greatest volumes all flow through the collector/semi-wholesaler/retailer axis and, apart from the retailers/sorters, there is little specializing of retailers or semi-wholesalers by quality or variety as they all deal in several types of imported and local rice. Nevertheless, some distinct channels can be identified. These are:

• Channel 1: Rice sold and consumed in or near to the point of production. This channel is represented by the arrows that converge on the production region market box—ether in the form of direct producer-toconsumer sales or through collector/retailers who travel only short distances. Price in this market is closely related to the prevailing purchase price for milled rice in the areas of production. Although the prices and volumes in the map are for the Ségou region, the basic value chain sequence of transactions in this segment

<sup>&</sup>lt;sup>20</sup> All prior studies and experts agree that these mills were non-competitive in comparison with the small-scale hullers that proliferated in the ON zone over the same time period.

<sup>&</sup>lt;sup>21</sup> Rice is not imported by rail from Dakar, as importers cite the absence of space, long delays and pilferage as reason to prefer road transport from Guinea, Cote d'Ivoire or Ghana.

would look quite similar in the other rice-producing regions of Mali such as Timbuktu, Mopti and Sikasso. Thus, this can be considered representative of those regions as well.<sup>22</sup>

- **Channel 2: The traditional small-scale trade channel.** This channel is represented by the 267,000 MT flowing from the small farmer box to collectors after service processing by small mobile hullers. With an estimated 80 percent of total traded volumes, this is by far the largest channel in terms of volumes. Quality levels in this channel are quite variable, with collectors accepting almost all hulled rice and providing price discounts for poorer qualities.
- Channel 3: Industrial rice milling channel. While the large industrial mills largely stopped processing local rice in the late 1990s, there are signs that this channel may be opening up again. At least two large major wholesaler/importers are processing local rice on very small quantities at present. Groupe AMI has installed a line with five 40-ton/day capacity rice mills and in 2008/09 began to purchase 2,000 tons of paddy in a market test as preparation for launching a line of high-quality local rice. GDCM-SA is also planning on launching a branded line of superior local rice in 25kg bags that are processed by new sorting and cleaning equipment that it has installed in its Segou flour mill. GDCM-SA is currently treating about 10,000 tons of milled rice a year. In contrast to earlier industrial milling efforts, these experiments are based on recently purchased equipment that can operate efficiently at smaller capacities than the older privatized industrial rice mills.
- Channel 4: Farmer association channel. Farmer associations are active sellers of rice. Organizations that are part of the Faso Jigi structure collect milled rice from individual farmers for storage in a warehouse rented by the Faso Jigi apex structure. The stored rice serves as collateral for a working capital loan through a warehouse receipt mechanism that allows farmers to repay input credits and take advantage of season price swings by storing rice after harvest. First-level farmer organizations not affiliated with Faso Jigi collect paddy from members mainly as in-kind reimbursement for input supply credits and harvesting services from farmer organization harvest machines. The paddy is then hulled with mobile hullers or mini rice mills belonging to the group and sold to pay back the input supply loans and harvesting fees owed to the group.
- **Channel 5: Mini rice mill channel.** The flow of rice in this channel consists of rice sold directly by mini rice mills as their own property, not including rice processed as a service to small farmers. Mini rice mills either purchase paddy directly from farmers or, in a strategy similar to the market retailers/sorters and GDCM-SA, purchase hulled rice from small farmers, and then clean, sort and repackage the rice in homogenously sized lots.
- **Channel 6: Commercial farm channel.** Commercial farms generally hull rice with their own hullers, which may be either good-quality mini rice mill-type mills with combined hullers and polishers or lesser-quality mobile-type hullers. Commercial farms generally seek to bypass the semi-wholesalers and either sell to retailers or directly to consumers.

### **VALUE CHAIN DYNAMICS**

There are two major dynamic trends in the rice value chain. The first of these is the recent increase in rice prices, which seems to be driven by a combination of higher international prices and a healthy demand for local rice. The spike in the price for both local and imported rice shown in Annex B for the 2007/08 season occurred principally

<sup>&</sup>lt;sup>22</sup> The main difference between Segou and these other regions is that the prevalence of diesel powered mobile hullers is much lower, so that more paddy is hulled with traditional mortar and pestle technology.

between November 2007 and August 2008, a period that represents the sharpest increase in world rice prices in over a decade—with an increase of more than 150 percent in the price of Thai rice during the first four months of 2008.<sup>23</sup> The spike in world prices came down significantly in the second quarter of 2008, and the prices of both Malian and imported rice in Bamako have also come down—but with a much steeper drop in the price of imports. These high prices would seem to indicate that demand for local rice is increasing. This is further supported by the fact that local rice prices remain high relative to imports over a period in which growth in local rice production has largely outstripped population growth.<sup>24</sup> All this indicates that the demand for local rice has outstripped the growth in its supply over the past several years.<sup>25</sup>

The second clear trend is the emergence of a specific market segment for "high-quality" local rice. This new trend means that the market for local rice is largely bifurcated into two distinct segments:

- (a) A high-end segment consisting exclusively of local rice that has been polished to give it a good luster and cleaned of impurities. Often the rice is sorted and undergoes size calibration to ensure a homogenous mix of rice grains of similar characteristics (usually long grain or broken grains of various size);<sup>26</sup> and
- (b) A mass market segment consisting of imported rice and un-cleaned and heterogeneous local rice.

With a 15 to 20 percent price premium for the high-end segment, a diverse group of value chain actors have started to position themselves to supply this emerging segment. The actors who have devised or are in the process of devising strategies to do this include the two industrial mills belonging to wholesaler/importers (GDCM-SA and Groupe AMI), mini rice mills and the market retailers/sorters. They all have developed business strategies (in descending order of capital intensity) to capture part of this market.

The emergence of this high-end local rice market segment in the last five years seems to be driven by growing demand on the part of wealthier households, restaurants and collective institutions. All of these classes of consumers prefer to purchase rice that is clean and homogenous. Given the nascent nature of this segment and the lack of prior market studies, little information is available to assess its relative size and depth. All that is certain is that the high-end segment is still very small compared to the mass market segment. However, it seems to be growing, as witnessed by the widening price differential in the two segments and the attention it is attracting from several actors in the value chain.

### SYSTEMIC CONSTRAINTS IN THE VALUE CHAIN

### **BUSINESS ENABLING ENVIRONMENT CONSTRAINTS**

There are four critical binding constraints in the business enabling environment that block value chain growth. These are most evident in the zone of the Office du Niger, since this is the zone with the most complicated value chain relationships that respond to factors in the enabling environment. Thus the discussion that follows builds largely on

<sup>&</sup>lt;sup>23</sup> This is based on commodity price for 5 percent broken milled Thai rice as reported by IMF commodity price statistics.

<sup>&</sup>lt;sup>24</sup> Evidence in support of the hypothesis that price increase in 2007/08 was due to demand shifts include the fact that rice production largely outstripped population growth as volumes of rice produced grew by an average of 23 percent per year between 2005/06 and 2008/09 while population growth was in the range of 2.7 to 2.8 percent per year.

<sup>&</sup>lt;sup>25</sup> The fierce competition for access to land in the ON would tend to confirm the hypothesis of the basic profitability of rice production.

<sup>&</sup>lt;sup>26</sup> It is important to note that the conventional assumption that broken rice is considered to be an inferior product does not hold in Mali. This can be seen from the price structure of rice in which the same lot of mixed rice can be sorted into long grain and brokens—both of which retail for higher prices than the unsorted rice.

ON examples. Nevertheless, most of these constraints are present to some degree in the other productive systems. The only exception is the last constraint concerning land tenure, which is specific to the ON.

1. There is a significant heritage of mutual distrust between actors in the value chain and in the enabling environment that inhibits market-based cooperation. Given the checkered history of private-sector involvement in rice marketing and input supply in the ON zone (discussed above under "Strategy"), combined with the involvement of donor projects and politicians in the design of farmer organizations and their marketing strategies, there is both a lingering climate of distrust between farmers and traders and a tendency among both groups to seek out competitive advantage through non-market means. For wholesalers/importers, this means obtaining exonerations from normally applicable import taxes. For farmer organizations, this may mean concluding marketing agreements that seem to be oriented more toward pleasing politicians than farmers. For farmer organizations supported by projects. Compounding these problems is the fact that the lack of secure land tenure in the ON zone and the diverse ethnic character of the families receiving occupation rights significantly weaken many of the normal cross-cutting social ties that ensure village-level cohesion—often contributing to governance problems and a lack of accountability for bad debt in farmer organizations.

In such a context, the development of stronger, better-coordinated vertical supply linkages in the rice value chain faces many obstacles. Not only are farmers and traders suspicious of each other, but there is a web of intermediating institutions, including farmer organizations of varying quality and motivations, politicians, donor projects and the ON itself, all of which influence the incentive structures facing actors in the value chain. This web of complex overlapping relationships poses a real challenge to efforts to develop clearer incentives for improving product quality—since actors at all levels have multiple commercial options and many have strategies for maximizing their private returns by obtaining favorable treatment from farmer organizations, politicians, the ON or even donor-funded projects.

2. Import exonerations discourage upstream involvement on the part of wholesaler/importers, who have the potential to become lead firms in the value chain. The pattern of offering import duty exonerations in three of the last four years, so that up to two-thirds of all rice imports take place outside of the normal structure of protection, exerts a strong influence on the business plans of wholesalers/importers. It is far easier for these actors to arrange delivery of rice at precise volumes and quantities with a few telephone calls and faxes to brokers in London or Geneva than it is for them to supervise a local rice buying campaign with a multitude of collectors, buying points, non-specific qualities and quantities. Therefore it is hardly surprising that, given the additional advantage of importing tax-free, they show much less interest in the local rice market. The interest of wholesalers in maintaining exonerations from 2007/08 during 2008/09 is clear from their collective position expressed to the GOM which was that they could not find sufficient quantities of local rice to purchase in 2008/09-a statement that seems dubious given the record production and the presence of large quantities of local rice in virtually every market in Mali. For such actors, changes in the level of protection afforded to domestic rice has a huge impact on their incentives and willingness to take on roles as lead firms in the rice value chain. The inconsistent nature of the current import taxation regime creates a high level of uncertainty and makes it hard for such actors to justify concerted efforts to develop domestic supply channels. With recent policy swinging between a 32 percent and 0 percent level of protection for domestic rice, there would seem to be at least some room for establishing a more stable positive rate of protection for domestic producers at a rate under the 32 percent maximum.

**3.** Subsides under the Government of Mali's Rice Initiative program discourage private-sector involvement in the rice value chain. Although the *Initiative Riz*'s overall objective of stimulating rice production is laudable, its subsidy program for equipment is being implemented in a way that largely by-passes private-sector operators, thus discouraging their greater implication in the value chain. This is especially critical at the processing level, as five mini rice mills allocated in 2009 were all set up in farmer organizations—one in each of the main production zones of the

ON. This practice of viewing farmer organizations as the favored locus for investments in processing technology, associated with a high subsidy component,<sup>27</sup> poses the problem of the crowding out of private SME actors, who are also potential processing service providers. Given the generally poor record of farmer organization-operated mini rice mills in the ON, it seems clear that the economic return of such investments could likely be expanded through a greater focus on SME operators. <sup>28</sup> Reasons for the poor performance of farmer organizations stem from a number of factors, including: the lack of clear ownership and attribution of responsibility for meeting necessary maintenance expenses; a lack of business orientation (often undermined by repeated subsidies); and weak governance systems. Unlike farmer organization mills, owner-operated SME mini rice mills have a clear owner who derives much of her or his income from the mill's operation and who knows there is no one else to look to when operating expenses and repairs need to be made.

**4. Weak and conflicted farmer organizations.** As pointed out above, the performance record of farmer organizations is mixed. The IICEM project has enjoyed success in its work with women's groups engaged in lowlands *bas fonds* rice in the Sikasso Region. Farmer organizations in this zone fill key roles in input supply, maintenance of water retention structures and in the marketing and storing rice after harvest. This success is facilitated by the small size and homogeneity of the first-level groups in small lowlands basins. IICEM staff report that improved seeds and inputs have led to yield increases from 0.8 to 1 ton per ha for unimproved production to over 2 tons per ha in assisted women's *bas fonds* production groups in 2008-09. This new production has created, for the first time, significant surpluses of production over household needs that have fed into earlier Trade Mali investments in village warehouse warrantage schemes that allow the women to stock rice beyond the harvest season to benefit from seasonal price fluctuations. IICEM staff report that after some initial support, the women's groups involved are fully able to organize the collective management of input supply, water retention structure maintenance and storage financing. This success is no doubt aided by the fact that the groups are relatively small and homogenous.

However, particularly in areas where farmer organizations are larger, more diverse and need to cover a wider range of functions including irrigation systems maintenance, their record of performance is less brilliant. In the ON zone which is characterized by all of these challenges, difficulties abound. The entire farmer organization system in this area had largely collapsed by the early 2000s under the weight of unpaid input loans that left only around 30 percent of groups eligible to access credit. The apparent failure of the heavily supported Faso Jigi marketing initiative (see Box 1) is matched by the widespread preference of farmers for selling milled rice to collectors who also generally offer better prices than farmer groups outside of the Faso Jigi system. In fact, farmers who do not require the intermediation of their group to access production credit generally sell all their rice to private collectors. Farmers who receive production credits through their farmer organization beyond what they are required to submit to pay back their loan—again preferring to sell most of their harvest to collectors. Thus, the failure of farmer groups to become effective marketing agents for rice seems to be virtually universal.

<sup>&</sup>lt;sup>27</sup> At the time of the study team's filed visit, the farmer association in Fobugu stated that it did not know what the cost of its mini rice mill was and that payment modalities would be discussed at a later time. Faranfasi So reported to the team that the farmer groups had refused to go into debt for the mini rice mills, whose costs was 28 million CFA apiece, and that this was the subject of ongoing negotiations between the groups, the ON and the GOM.

<sup>&</sup>lt;sup>28</sup> The African Development Foundation (ADF), offered capital grants for 22 improved mini rice mills with sorting equipment using low cost Chinese equipment in the early 2000s for groups in the ON zone—none of which are reported to be functioning according to Faranfasi So. In contrast, two loan-financed USAID CAE-supported private mini rice mills from the late 1990s are still functioning using the same Chinese equipment as was used in the ADF grant—one in Niono and one in Diabaly.

However, even in the ON zone, the situation is not entirely bleak. The cooperative federation Faranfasi So has been providing loan work-out services and legal support to farmer organizations with the associated consulting firm Nyeta Conseils under a program financed by the AFD. As a result, 50 percent of groups in the ON zone and 90 percent of Faranfasi So members are now in good standing with financial institutions and are eligible to receive seasonal input loans. The main elements of this program are the drafting of legal debt recognition documents, a certain level of debt forgiveness and the commitment of the groups to pay back rescheduled debt. Faranfasi So/Nyeta Conseils are also working with the ON to encourage groups to register as cooperatives, instead of multi-purpose village associations. This provides a much clearer legal foundation for the ownership of assets and helps to insulate the management of the farmer organizations from the political/administrative functions that co-exist with economic activities in multi-purpose village associations.

Although no comparative evaluations of farmer organizations have been conducted that would provide a firm basis for drawing lessons from the varied experiences of different models of farmer organizations, one general lesson seems clear: Farmer organizations have had much more success as intermediaries that serve to reduce the transaction costs of external support service providers to small farmers, as opposed to acting as economic centers of profit and loss themselves. It is clear that the role of farmer organizations in facilitating household access to credit, centralizing input orders and providing leverage for extension and training efforts are vital functions for which a clear record of success has been established, even within the difficult environment of the ON zone. In contrast, the record of farmer organizations as market actors, engaging in processing and marketing activities of rice on their own account, is hardly as successful. The perils of assigning market roles to farmer organizations can also be illustrated by the simple fact that farmer organization representatives were recently negotiating within the framework of the Initiative Riz to sell large quantities of rice below market prices as part of politically motivated arrangements. That such deals could be signed shows the lack of concern with business-oriented results on the part of some farmer organization leaders. Although incidents like this are often ascribed to a "lack of business training," they are often just as much a result of the fact that farmer organizations are not structured to function as commercial enterprises with predictable mechanisms for remunerating investment or allocating retained earnings.<sup>29</sup> Without such mechanisms, it is neither surprising nor illogical that farmer leaders should occasionally be more interested in amassing political credit using the farmer organization as a vehicle than in the financial results of the organization.

#### Box I: Faso Jigi

The Faso Jigi apex structure has been a conduit for the marketing of rice and offseason vegetables from farmer groups in the ON with support from various donors since its inception in 1996, most recently under the framework of the CIDA-financed PACCEM project. However, despite this long history of support, CIDA has recently determined that the Faso Jigi structure is not sustainable in its current form. Since CIDA support for Faso Jigi's operations is being reduced with the close of PACCEM, Faso Jigi is entering a period of instituional uncertainty. Reasons for these difficulties are linked to the inability of Faso Jigi to function as a marketing intermediary at a cost that is competitive with private traders. Faso Jigi has seen its rice volumes decline from between 5,000 and 6,000 MT in the 3 years prior to 2007/08 to only 3,500 tons in the last campaign. Because of the low volumes, 80 percent of primary groups are now in negative net positions relative to the apex body, which has reimbursed the BNDA for all the production credit taken out by its members, as it is required to under the terms of its guarantee. Reasons for this failure appear to be the high costs of operation that have meant that in 2007/08, even with rebates, farmers received only 245 CFA/kg from gross sales conducted at 290 CFA/kg. At these margins, Faso Jigi is not competitive with most private collectors, who were purchasing from farmers at 270 to 280 CFA/kg. Faso Jigi staff also cite obstacles to ensuring accountability for unpaid debt and governance problems in primary groups as being important contributing factors.

<sup>&</sup>lt;sup>29</sup> This is much less true for cooperatives, which do possess governance structures and procedures for protecting the interest of cooperative members, although the mere existence of these structures is no guarantee of their effectiveness.

5. The lack of secure land rights and lack of effective sanctions for inadequate irrigation infrastructure maintenance have combined to lessen yields and lower paddy quality in the ON. While the official ON figures for production show yields of around 6 tons per hectare in rehabilitated plots, rice analysts acknowledge that the true figures are around 4.5 tons per hectare. Although non-optimal fertilizer applications and formulas may be responsible for some of the differential, along with non-respect of planting protocols, most of the reasons for the unfulfilled yield potential are thought to be related to inadequate water control—principally the poor drainage in many sections of the ON. This lowers yields and renders proper drying of harvested rice impossible, leading to high loss rates during hulling. The issue of water control is, in turn, related to poor maintenance, which is prevalent in secondary canals and drains that are the ON's responsibility and tertiary canals that are the responsibility of the farmers.

The root cause behind this constraint lies in the complicated interplay between the various actors in the ON. At the lowest level, farmers who are unsure if they will retain access to their land because of non-payment of water user fees have little incentive to fulfill their maintenance obligations to clean their field and adjacent tertiary canals and evacuation channels. At the next level, water user groups organized by the ON have no ability to enforce sanctions for non compliance; nor do village associations. Lastly, the ON itself is obviously in a state of non-compliance in many zones. With the added factor of the ethnic heterogeneity of ON villages and lack of cross-cutting ties, the end result of this cascading non-respect of maintenance obligations is an environment in which incentives to maintain irrigation are gradually eroded by institutional passivity and diffusion of responsibility.

### **CONSTRAINTS TO ACCESSING END MARKETS**

Value chain actors' ability to access end markets is limited by constraints than can be placed into two broad categories: those relating to quantity and those relating to quality. Each of these is discussed below.

### CONSTRAINTS RELATED TO QUANTITY OF PRODUCTION

Lack of access to water. Rice cultivation in Mali is dependent on access to irrigated water. Even in the Southern belt where annual rainfall reaches over 800mm, productivity can be improved and inter-annual variability reduced through the construction of small-scale water retention structures to create small reservoirs with controlled water release. Achieving increases in rice production based on expanded areas on any significant scale will inevitably require new investments in engineering surveys and construction of new irrigation systems.<sup>30</sup> As shown above in Table 2, there are significant areas available with hydrological potential for large-scale expansion of all the different productive systems. Since prior experience with using long-term debt instruments to favor farmer funding of infrastructure have not yielded promising results,<sup>31</sup> expansion will depend on the availability of donor/GOM financing for water infrastructure.

Lack of access to farm-level training and extension. There are well-adopted technical packages for rice cultivation for all the systems of production in Mali—with the possible exception of rainfed Nerica 4. However, farmer access to effective extension advice and technical support is virtually non-existent, particularly outside of the main zone of rice production in the ON. Diffusion of knowledge about appropriate varieties and improved planting techniques (primarily transplanting) for controlled flooding and rainfed *bas fond* and upland systems is quite low. Project-

<sup>&</sup>lt;sup>30</sup> The GOM Rice Initiative's strategy of increasing rainfed rice production through the widespread distribution of Nerica 4 rice in the South is an ambitious attempt to expand rice areas without financing new investments in water infrastructure. It is also quite risky since there have been minimal field trials to assess how various strains of Nerica 4 will react to the variety of conditions that exist in the targeted areas.

<sup>&</sup>lt;sup>31</sup> PRODEMPAM for instance encouraged groups engaged in irrigated village perimeters to take long-term loans to pay for initial construction of irrigated infrastructure. This left recipients with longer term debt on top of shorter term loans for production credit and pumps that led to significant repayment problems in a number of instances. As a result, some groups lost access to input loans due to too heavy debt obligations.

supported extension systems provide virtually the only vehicles for such training in Mali, given the lack of adequate input-supply dealer networks.

Lack of capital and access to finance among start-up farmers outside of the ON zone. Small farmers operating in irrigated village perimeters and controlled flooding and rainfed systems are generally poorer and more marginal players compared to small farmers in the ON. Without capital resources to finance the start-up costs of cultivating new rice areas or farmer organizations with established track records for accessing credit, such farmers also usually require some form of initial capital grants to enter into improved rice production. Beyond the first year, financing through village solidarity groups is feasible, but also requires a heavy investment in training and farmer organization strengthening and even capacity building with local MFIs. With this lack of material and institutional assets, increasing production through expansion of new areas in these productive systems requires high levels of donor subsidy to cover initial investment costs in inputs, train farmer organizations, and set up systems of production finance that can function after the initial set-up period.

### CONSTRAINTS RELATED TO THE QUALITY OF MARKETED RICE

Two key constraints affect the quality of the local rice that reaches the market.

**Poor processing technology.** With around 80 percent of marketed rice that flows any great distance being fed through small mobile hullers, the inherent limits of this technology impose a significant constraint on the overall quality of Malian rice. Even with "correction" through cleaning and sifting of rice downstream in the value chain, the high levels of loss from lower technical rates of transformation impose a significant added cost that cannot be recovered. Farmers moved rapidly to this technology in the 1990s because it gave them control over marketing decisions, since they did not have to deliver their paddy to a monopolistic mill that would unilaterally determine their terms of payment. However, the cost in terms of deteriorating quality and physical losses is quite large.<sup>32</sup>

**Poor quality of unhulled paddy rice**. Incorrect post-harvest handling can inflict serious damage to paddy that results in high loss rates during hulling and stained or discolored grains that sell at a significant discount, if at all. All actors report that problems related to persistent humidity in many of the fields of the ON due to inadequate drainage have been contributing to poor paddy quality. Indeed, since it is extremely difficult to judge the quality of paddy unless until it is hulled, some actors—including mini rice mills in the zone of production that target the high-quality market—prefer to reprocess rice already hulled by mobile units in order to avoid losses associated with purchasing substandard paddy. This fact has also discouraged players higher up in the value chain from moving downstream and entering the market for paddy—although the Groupe AMI's experiment this year with paddy purchases offers an interesting exception.

## VERTICAL AND HORIZONTAL LINKAGES AND VALUE CHAIN GOVERNANCE

The Malian rice value chain clearly operates under a market-type governance structure. As shown in the value chain map, actors at virtually all stages of the chain have multiple options for transacting business with suppliers below them and clients above them. Indeed, maintaining multiple client and supplier relationships is important, as it helps actors

<sup>&</sup>lt;sup>32</sup> If all the 267,000 tons of rice estimated to be flowing through the mobile hullers in Figure 1 were processed through mini rice mills at a 62 percent yield rate rather than the normal 55 percent for a standard mobile huller, the overall quantity of marketed rice would be increased by 33,000 MT. Without even considering the probable increase in quality, this would represent a net gain of \$20 million valued at a first level market price of 290 CFA/kg. While it is unrealistic to expect all marketed rice to transit through mini rice mills, even achieving a 20 percent market for mini rice mills would result in a significant savings.

to maintain negotiating leverage in market transactions. But vertical linkages and inter-firm cooperation in the value chain are quite weak. Horizontal linkages are also fairly weak. They are important mainly at the level of farmer organizations, which play a critical role in reducing transaction costs for suppliers of support services as well as in aggregating small farmer production. However, the quality of farmer organizations is extremely variable, with many experiencing governance problems and virtually all requiring significant levels of assistance to become sustainable. This is particularly true in the ON Zone, where a history of bad debt and heavy subsidization has undermined notions of budgetary discipline and accountability in many farmer organizations.

The consequence of these weak linkages and lack of inter-firm cooperation are clear: there is little coordination among value chain actors to grow volumes and increase the efficiency of production and marketing systems. The impact of these weak linkages contributes to the following problems in the value chain:

**Unclear incentives for irrigation structure maintenance**. The diverse web of institutional responsibilities for irrigation canal maintenance in the ON zone, combined with the weak nature of farmer organizations and their permeability to political influence make it quite hard to confront the problem of inadequate irrigation infrastructure maintenance. Farmer organizations and the smaller water user groups constituted on the hydrological block level are unable to effectively sanction farmers who do not clear and maintain tertiary canals. <sup>33</sup> Similarly, farmers have virtually no levers for pressuring the ON or the GOM since non-payment of water user fees leads automatically to expulsion. Without a redefinition of rules governing how the ON, individual farmers and farmer organizations relate to each other, it will be difficult to effect positive changes in this area, which is critical to improving paddy quality.

The absence of value chain alliances to promote improved processing technology. Cooperation between firms at different levels of the value chain to introduce improved processing technologies-mainly mini rice mills-is virtually absent from the value chain. In particular, there is a clear congruence of interest between wholesalers/importers, who have noticed the emerging market for higher-quality rice and are looking for well-sorted homogenous lots, and mini rice mill operators, who have the potential to meet this demand but lack capital. One promising experiment in this regard took place in 2007/08 between a mini rice mill operator in Segou and GGB, one of the three major wholesaler/importers. With a standing order and rapid payments from GGB, the mini rice mill sold 2,500 MT of rice operating on a continuous production schedule for almost the entire calendar year. However, GGB stopped purchasing in 2008/09, as it abandoned the domestic rice market to focus exclusively on importing rice under the special tax exoneration regime. As a result, total volumes of rice treated by the mini rice mill fell to 1,000 MT. While this example shows the potential for such alliances, it also shows that commitment to them from wholesaler/importers is far from certain. While this is partly the result of the peculiar incentive facing wholesalers/importers following the adoption of the import tax exonerations, it is also the result of the nature of many wholesaler/importer businesses-most of which are run under highly personalized management systems centered on owners who grew their companies out of successful informal sector trading enterprises. Such firms owe their success to their rapid reaction to changes in market margins, minimizing fixed investments and diversification of risks among several business lines. For such firms, investing in longer-term business partnerships, particularly where prior personal relationships may not exist, is an extremely difficult step for owners to take.

Lack of value chain actors with business strategies based on quality specialization. With the exception of market sorters/retailers and the mini rice mills, both of which are still quite small in terms of absolute numbers and volumes treated, few actors in the rice value chain have business strategies based on quality specialization. Quality specialization is possible only at very small turnovers since it is difficult for any actor to amass significant volumes of good-quality paddy or good-quality homogenous milled rice. Amassing large amounts of paddy would require

<sup>&</sup>lt;sup>33</sup> The ON has organized local water user groups to observe and report on irrigation maintenance needs and problems through farmer organizations, but these groups have little real power.

coordination at the farm level to ensure that good production and post-harvest handling procedures are respected particularly drying after harvest. Larger buyers, including wholesalers/importers and semi-wholesalers, purchasing mainly through free-agent collectors, have virtually no interaction with farmers or appreciation of field conditions that affect paddy quality. They are thus quite reluctant to enter into anything but spot market transactions for milled rice whose quality they can judge and price accordingly. And without processors able to sort larger volumes of rice by quality, there are virtually no suppliers capable of delivering large volumes of specific qualities of milled rice. Overcoming these difficulties would require improved coordination among traders, processors (equipped with better technology), farmers and farmer groups. With the history of distrust between private-sector actors, farmers and farmer organizations, as well as the non-commercial nature of the incentive structure facing many farmer organization leaders, the countervailing forces standing in opposition to the development of closer relationships are still quite strong.

Lack of value chain financing for farmers. The lack of vertical linkages between farmers and their buyers as well as the lack of well-developed associated input markets (addressed below) means that, for most financing needs, rice farmers are on their own. Credit for improved inputs (mainly seeds and fertilizer) is a serious constraint to production due to the asset-poor status of most family farmers, particularly outside of the ON zone, and the lack of credit products appropriate to the agricultural cycle. Solutions to this constraint lie in strengthening the needed horizontal linkages among farmers via farmer organizations and helping local MFIs to develop appropriate credit products and access lines of refinancing where required.

## V. SUPPORTING MARKETS NEEDING UPGRADING

Although some markets function noticeably better in the rice value chain than for other crops because of the high profitability of rice, a number of key supporting markets remain quite underdeveloped. These include markets for the following:

Storage of rice stocks. The Projet d'Appui à la Commercialisation des Céréales au Mali (PACCEM) and Faso Jigi have made a concerted effort to develop warehouses at the farmer organization level in the ON-both with primary groups and with a rented Faso Jigi APEX group controlled warehouse. In this system rice is stored first at the primary group level in small quantities and then sent to the central Faso Jigi warehouse. A guarantee fund held by Faso Jigi permits partial payments at harvest to first-level groups and farmers through a BNDA loan. Stocks are then stored and marketed collectively by the APEX body with financing and operational costs deducted from sales. A slightly different approach has been pioneered by the Trade Mali project relying on smaller village level warehouses under the crédit stockage vivrier (CSV) program. This storage scheme relies on primary group storage in locked warehouses that are used as collateral for group loans from MFIs that permit farmers to receive some payment at harvest while leaving the possibility of retaining rice to benefit from seasonal price increase. The main difference compared with Faso Jigi is that the CSV approach is based entirely on primary level farmer organizations and has smaller warehouses that are locked and supervised jointly with the MFI. This gives the financial institution control over stock withdrawals and the ability to collect loan reimbursement from farmers at the point of sale in the warehouse. Because sales decisions are devolved to individual producers, farmers can decide when and how much to sell, rather than delegating this responsibility to producer organization. The low costs of the CSV approach and the possibility it presents for producers to retain control over their own stocks make it potentially more replicable than the more centralized, higher-cost Faso Jigi model

Unfortunately, neither the CSV nor the Faso Jigi model have spread to many rice farmer organizations outside of Faso Jigi itself or to zones beyond the ON. The main reasons for this are the dependence of each model on donor physical investments to set up the warehouse and the dependence of each model on subsidized initial capacity building training for farmer organizations. On another level, while there are existing donor programs to promote storage with an objective to helping farmers profit from seasonal price swings, such as CSV and Faso Jigi there is a total absence of commercially functioning service warehouses or graders/sorters that would simply store and classify or sort rice for a fee to help reduce transaction costs by providing some level of transparent disclosure on stock quality and quantities to all potential buyers.

**Processing services.** As mentioned already, the Malian rice market lacks well-performing market service providers in the area of hulling, polishing and sorting. Mini rice mills represent a timid attempt to develop such a service, but their rate of penetration in the market is quite small.

**Input provision.** While seed multiplication is a thriving, profitable business for seed multiplication cooperatives in the ON, the market for fertilizer supply is the source of many reported problems for rice farmers. With only two large-scale importers of fertilizer, only one of whom has in-country mixing and repackaging capacities, there is a lack of competition at the upper levels of the fertilizer supply market. This manifests itself in a reported high degree of collusion in bids for centralized fertilizer purchase, which results in long-standing complaints about delivered product quality. No authority in Mali is able to control for fertilizer quality at the current time. Added to these problems at the upper level is the fact that no input supply company maintains a dealer network with personnel qualified to give advice to farmers. This function is usually devolved to extension agents working for donor projects or the public rice offices. Supply orders for fertilizer in this context are set to the emission of centralized fertilizer purchase bids by the GLOBAL FOOD SECURITY RESPONSE MALI RICE STUDY 37

ON, with most responding firms negotiating with the two large-scale importers to cut deals on access to in-country stocks. Firms responding to tenders from the ON and NGOs commonly add on quantities to the tendered amounts. They then import at these larger volumes and sell the excess volumes on the open spot market. It is these "over and above" quantities that generally find their way to small shops in the rice production zones. The Citizens' Network for Foreign Affairs (CNFA) is currently operating a training program for local fertilizer shop owners in the Segou and Bamako areas under financing from the Alliance for a Green Revolution in Africa. Two hundred and thirty-six dealers have been trained to date in cooperation with one of the two large fertilizer importers.

**Production credit.** Outside of the ON zone or zones covered by Office Riz Mopti or Office du Riz Segou, the availability of production credit for rice farmers is quite limited. To a certain extent the production credit issue is linked to the lack of capacity in farmer organizations, since the existence of well-functioning farmer groups is a prerequisite for production credit programs.

## VI. OPPORTUNITIES AND INCENTIVES FOR UPGRADING

The section below discusses the incentives for upgrading in the rice value chain on two levels: increasing production and improving quality.

## UPGRADING OPPORTUNITIES TO INCREASE TOTAL RICE QUANTITIES

There is little doubt that Mali is a competitive producer of rice. This can be seen from the persistence of high demand and high prices for Malian rice, even with the significant import exonerations of the past three years. The large-scale gravity-fed ON system has the highest potential for competiveness, but there is also good potential for smaller irrigated village perimeters, rainfed rice and controlled flooding systems. In all these systems, current market prices are significantly above production costs. As shown by the first column in Annex C, a farmer in the ON zone producing in the current off season following the most common practice of using a mobile huller would earn a net margin of 145 CFA/kg after hulling on sales of 300 CFA/kg—a net margin of 48 percent. As this analysis indicates, even with a downward adjustment in prices to account for the usual price drop in the main production season, there is clear economic incentive for farmers to produce more rice, particularly given the sustained increase in prices since the 2007/08 season.<sup>34</sup>

An important caveat, however, is that incentives for investment in rice production at the farm level are linked to the unavoidable issue of access to water. This can be seen by the contrast between demand for land in the ON zone (with excess demand for land that has ready access to irrigation canals) and the plethora of unsubscribed "potential" lands for which there are no takers other than donors due to the dissuasive condition that leaseholders invest in the needed irrigation systems. Thus the underlying profitability of rice production has not yet motivated farmers or private-sector actors to invest in water retention infrastructure on any significant scale.



Productive System	Cost of water infrastructure investment per Kg of expected annual rice production
Large-Scale Gravity-Fed (ON)	250 CFA/kg*
Irrigated Village Perimeters	58 CFA/kg*
Controlled Flooding	25 CFA/kg
Rainfed Lowlands Retention Structures	200 CFA/kg

\* Includes two productive seasons per year

While the calculation of the economic returns to rice production with the inclusion of the annualized amortization of investment costs for irrigation infrastructure was beyond the scope of this study (and would require substantial sensitivity analysis to account for the variety of relevant infrastructure options within each of the broader productive systems), a very rough estimate of the cost of irrigation investments can be derived by simply taking available estimates of the costs per hectare of irrigation structures from the different production systems shown in Table 2 and dividing by the total number of kilograms of rice produced in one year in each system. These results, shown in Table

<sup>&</sup>lt;sup>34</sup> *Initiative Riz* fertilizer subsidies are not a major distortion in farmer incentives. Using official cost figures from the GOM rice strategy, the 38 percent effective rate of subsidy in the ON for DAP and urea in 2007/08 represents a decrease in the cost of production of only 8.3 percent or 11 CFA/kg.

4, indicate that irrigation investment costs are hardly so large as to render rice production unprofitable, even if they are included in the cost of production, since these figures do not amortize the costs over the life span of the investments, which in the case of some of these systems can be well over twenty years.<sup>35</sup>

Table 4 does not show the associated "soft investment costs" of working with producer organizations to maintain the infrastructure and operate the systems. Irrigated village perimeters, controlled flooding and large scale gravity systems in particular all require heavy investments in produce organization capacity building. IICEM's experience in Northern Mali has show that irrigated village perimeters can attain productive yields if up to 12 tons per hectare which if they were used to calculate the infrastructure costs in Table 4 would show that this system would be the clear winner in terms of cost efficiency. Yet this would be misleading, since it is also not yet clear that even with significant training investments, such groups can fulfill their roles as organizers of water distribution, pump maintenance and fuel purchase over the long term. Factoring in these difficult-to-quantify soft costs would thus result in a discounting of systems that require producer organizations to assume a heavy role in production and the management of water resources. Seen through this prism, the small size and relatively light management role assigned to farmer organizations in the lowland bas fonds environments becomes a significant positive factor.

In any event, given the absence of private funding, the critical factor of access to water is likely to rely on continued donor funding of new irrigation infrastructure. Through its support to IICEM, UAID alone has financed over 1,200 hectares of new irrigated rice lands with investments in improved infrastructure in Mopti, Timbuktu, Gao and Sikasso. GTZ is also financing an expansion of small scale irrigated lands and numerous downers have lined up to subscribe to projects to open up new lands in the ON zone. The predominance of donors in this crucial role reflects the simple fact that farmers lack the technical ability to organize and supervise the needed engineering works. Nor have past experiences with using farmer debt instruments to finance long-term infrastructure investments yielded promising results. In this context, it is clear that the best opportunities for increasing production volumes through planting new areas lie in two main categories:

- Financing an expansion of rice areas with new investments in irrigated infrastructure that are relatively cost effective. With the fundamental profitability of rice well-established, Table 4 would seem to indicate that investments in controlled flooding systems first, and in irrigated village perimeters in second place, would yield the most results in terms of increasing rice volumes per dollar of infrastructure investment. As far as gravity-fed systems, the ON has already obtained commitments to finance 63,000 hectares in expansion of irrigated parcels over the next 5 years—which represents an increase of over 50 percent in current irrigated areas. Thus there would seem to be little reason to consider new investments to expand areas in the ON.
- Supporting the GOM's effort to expand rainfed rice in uplands. While the GOM's efforts to push an expansion of rainfed rice by distributing Nerica 4 did not have a large impact in 2008/09 because of a lack of seed and hasty implementation, the possible expansion of rice areas without a corresponding investment in water retention structures would be a major advance for the rice value chain and food security in Mali. This component of the *Initiative Riz* would certainly benefit from further support from donors in such areas as farmer group strengthening, agronomic trials and extension, credit system development and, after volumes have responded, in post-harvest processing and marketing.

<sup>&</sup>lt;sup>35</sup> The Table 5 figures should be considered to be low-range estimates since they are based on the lowest cost estimates of the infrastructure from Table 2 and the high-range estimate of yields. The relatively high cost for rainfed lowland retention structures reflects the wide variability in the amount of land that can be irrigated from small scale retention structures given highly localized terrain conditions.

## UPGRADING OPPORTUNITIES TO IMPROVE RICE QUALITY

As far as product quality is concerned, incentives for improvement are clearly positive in the emerging high-quality segment of the market for local rice. With a 15 to 20 percent price premium in the market for well-sorted, clean and homogenously sized local "Gambiaka", wholesaler/importers such as Groupe AMI and GDCM-SA have already noticed the extra margins to be had from selling cleaned and sorted Malian rice that is not yet available in large volumes. To produce such rice they either have to enter the paddy market and hull the rice themselves (which is Groupe AMI's strategy), work through a network of mini rice mills able to achieve high-quality standards, or sort through hulled rice that has been already processed and partially damaged by small mobile hullers (which seems to be GDCM-SA's strategy). Farmer organizations are key potential partners in each of these cases, since their involvement is critical in addressing the paddy quality issue prior to the point of hulling—whether this is done in a larger industrial setting or by a local mini rice mill. The potential for such cooperation is only now becoming apparent, driven by the emergence of the demand for high-quality rice.

Upgrading of quality requires actions on two levels: (a) introducing improved processing technology with lower loss rates that can produce a clean, sorted product; and (b) developing a mechanism for ensuring access to better-quality paddy. These two requirements are inextricably linked. Without good-quality paddy, the return on investments in new processing equipment will be lessened by the poor quality of the product passing through it. Annex C illustrates the potential gains to be had from such technology. It shows that even with the relatively simple equipment (which is much less expensive than what the GOM is distributing under the *Initiative Riz*), mini rice mills have the potential to offer better returns to farmers, thus justifying sales in paddy instead of the current practice of marketing hulled rice.

The calculations in Annex C illustrate the potential gains to be had at the farm level from raising the bar in terms of processing technology. The ways in which these gains could actually be realized may take several forms:

- Mini rice mills operating independently and marketing an improved product to upper-level value chain clients;
- Vertical alliances between wholesaler/importers and mini rice mill suppliers; and
- Industrial millers (wholesalers/importers) directly sourcing paddy through local agents/farmer groups, thus bypassing mini rice mills altogether.

In addition to the potential in the purely technical issue of producing improved-quality rice, a clear potential exists to develop an export market over the medium term. But this will be linked to two prerequisites: (a) the realization of significant increases in volume of quality rice production; and (b) the emergence of actors who are able to fulfill contractual agreements to provide specified qualities of Malian rice that respect standard norms in large volumes. It also assumes that the GOM will not implement a ban on the export of food products as it did in 2007/08. The experience of the USAID CAE project, which sent a delegation of rice wholesalers on a prospection trip to Burkina Faso and Côte d'Ivoire in 2001, is interesting in this regard. The participants report returning with a lot of enthusiasm about the receptivity of these markets to long grain Malian rice, but there was no subsequent follow-up since they were unable to find actors who could organize production of standard-quality hulled rice on a large scale to fill possible orders. Difficulties centered mainly on finding and securing financing for large quantities of good-quality paddy.

# VII. STRATEGY

## VISION

By the end of 2019, Mali will have realized a significant increase in rice production volumes with an increase in paddy production from 1.6 million MT to 3.9 million MT (an increase of 244 percent). This will be driven by a 150 percent increase of areas under total control in the ON and by an exponential increase in volumes from rainfed rice with the adoption of Nerica 4. Further increases will come mainly from an expansion of controlled flooding and irrigated village perimeter systems. In addition, an estimated 1.5 million MT of high-quality milled rice per year (2.4 million MT of paddy) will be exported to feed expanding demand in regional markets. A progress reorientation of the milling function will transform the rice sector. Poorly performing mobile rice hullers will be replaced with stationary SME mini rice mills with an inflow in private investment and the emergence of clearly defined grades and standards for both paddy and sorted hulled rice. These standards will encourage small farmers to improve post-harvest handling to capture new price incentives linked to the quality of paddy. This differentiated market segment for high-quality paddy will largely feed the growing "high-end" local consumer segment and the regional export market with the involvement of Malian cereals importers. The importers will begin to add a line of high-quality rice exports, possibly with a shared product branding strategy, to the continuing import of mainly lower-quality cheap Asian rice for poorer consumers. Because of the large increase in rice volumes, increase in consumer prices of rice will be moderate—which has a significant impact on overall poverty rates because of the rising share of rice in household consumption. However, because of the opening up of an export channel, rural rice producers will be able to enjoy higher farmgate prices for rice sold into the high-quality segment of the market without this having a negative effect on the poverty rates of the most vulnerable households.

### VALUE CHAIN COMPETITIVENESS STRATEGY

Over the last ten years, since the end of the period of cereals market reform and the adoption of the key liberalizing reforms that reduced the role of the ON and the GOM in rice marketing, donors and the GOM have been primarily focusing on promoting rice production.<sup>36</sup> The steady increases in production volumes over this period indicate that these activities have met with some success. During this period, USAID has supported a number of programs that have demonstrated an ability to concoct the right mix of training on agronomic production techniques, farmer organization strengthening, investment subsidies for building water retention infrastructure and production finance. Thus the critical "recipes" for how to increase rice production in different productive systems for rice in Mali are by now well-established.<sup>37</sup>

To achieve the above vision for the rice value chain, with its ambitious volume targets, more needs to be done in the area of production support. This will entail USAID, the GOM and other donors deciding in which productive system they wish to allocate support for production—following known formulas that have demonstrated their ability to produce results. While necessary, these activities alone will not be sufficient to facilitate the qualitative change in the value chain that must accompany the growth in productive volumes if Mali is to improve rice qualities to the point where it can become a real export player in the region and raise rural incomes significantly in rice-producing areas.

<sup>&</sup>lt;sup>36</sup> The CIDA-financed PACCEM project was an important exception.

<sup>&</sup>lt;sup>37</sup> These include the DAD project's work in controlled flooding systems, and PRODEPAM/ICEM with irrigated village perimeters and rainfed systems.

The missing element in the value chain, as it is currently structured, is the lack of strong private investment in production, post-harvest handling and processing, particularly in the core ON region. To a large extent this reflects the simple nature of the rice value chain following the first generation of reform in which small-scale farmers, mobile hullers, collectors and semi-wholesalers rushed in to fill the territory being vacated by the progressive withdrawal of the ON. In this first wave of change that accompanied the liberalization process, actors' success was based on their ability to maintain low costs and adapt to farmers' new-found (and highly appreciated) autonomy.<sup>38</sup> Following the flux of the reform period in the late 1990s and early 2000s, market incentives were not yet clear to the main actors, nor were the appropriate institutional structures (the most important being strong farmer organizations) in place to provide well-functioning horizontal linkages among the many small farmers that could provide points of leverage to buyers and service providers.

However, the situation has evolved. The increasingly favorable price environment for rice since the 2007/08 season has ratcheted up incentives all along the value chain. New experiments and plans are being formulated by larger formal-sector rice buyers (wholesaler/importers) and SME processors (mini rice mills) showing that there is some renewed interest in improving processing technology to access higher margins at the highest quality levels. Furthermore, much progress has been made in cleaning up the financial and institutional disarray among farmer organizations in the ON after the disastrous problems of the late 1990s and early 2000s. Support markets for seeds and fertilizers, although still not working perfectly, are at least in better shape than they were five years ago.

Despite this evolution, there is still very little private investment in the rice value chain. Nor is there much progress toward improving the coordination of production, processing and marketing that is required for Mali to achieve its vision of developing into a regional supplier of quality rice. GOM strategies for introducing improved technology still largely bypass private firms, focusing instead on farmer organizations, which have not proven to be effective marketers or processors.

To bring change to the status quo and dynamize the value chain with an injection of private sector-led investment and vertical cooperation between firms, USAID needs to address the key obstacles in the enabling environment and buy down some of the risk to private-sector actors of investing in improved processing, post-harvest handling and, eventually, even in production. The strategy below presents activities aimed at doing this. These are anchored around a focus on improving rice quality since it is the high-quality segment of the market that is attracting the most interest from private-sector actors and it is there that export markets are likely to appear first.

The strategy for achieving the vision for the rice value chain has three axes (1) investing in improvements in production to increase overall production volumes and improve food security in key productive systems outside of ON lands; (2) facilitating private investment and inter-firm cooperation to greatly increase the availability of high-quality rice; and (3) working with value chain actors to remove key constraints in the enabling environment. Each of these axes is described in more detail below.

### AXIS ONE: SUPPORTING PRODUCTION

Increasing rice production will have a direct positive impact on food security and rural incomes. As noted above, the "assistance packages" for helping rural households move to higher levels of production with improved inputs and investments in water infrastructure have been well-established by USAID projects over the past ten years. The technical components of these packages entail intensive assistance to producer groups in the following areas:

<sup>&</sup>lt;sup>38</sup> The privatized rice mills failed on both these counts.

- Training on water infrastructure maintenance and formation of water user groups that are appropriate to the scale of the infrastructure put into place.
- Formation and capacity building for producer organizations to prepare them to help farmers in accessing credit for inputs, providing harvesting and storage services.
- Developing seed multipliers in conjunction with national seed service research stations using appropriate varieties.
- Providing mechanisms of extension training in conjunction with farmer associations or other local business service providers.
- Developing financing products with local MFIs and financial institutions to serve the needs of producers for production and marketing finance, including warehouse-based collateral schemes to prolong production finance.
- Administration of grants to capitalize farmers and producer organizations in start-up campaigns.

Given the substantial investments programmed for the ON zone over the next five years, USAID support for production should be focused on lands outside the ON. The areas of highest priority that should be considered for such support are (in descending order):

- 1. Areas suitable for the cultivation of upland rainfed rice. The potential for increasing rice areas in zones with suitable rainfall by planting Nerica 4 without investing in associated water retention structures is an exciting new possibility. This strategy is at the heart of the GOM's efforts to increase production under the *Initiative Riz*. Although the feasibility of producing Nerica 4 in different rainfall gradients between 800 mm and 1,100 mm is not yet well-established—with some discussion about what the exact minimum threshold is—even at the most restrictive 1,100 mm threshold, there is significant potential for expanding acreages particularly in the wettest parts of the Sikasso, Kayes and Koulikoro Regions, as shown in Figure 3.<sup>39</sup> As the cultivation of Nerica 4 in rainfed uplands is a new technology for farmers, support for expanding this system will require more initial emphasis on trial plots and adaptive farming systems research than will support for rice expansion in other productive systems.
- 2. Areas suitable for controlled flooding. With the extremely low cost per hectare for simple dike systems that can cover large flood plains, investing in controlled flooding water infrastructure is also extremely cost effective.
- **3.** Areas suitable for irrigated village perimeters. With a cost per kilogram of production that is only slightly more expensive than controlled flooding systems, irrigated village perimeters are another viable option for receiving production support.

<sup>&</sup>lt;sup>39</sup> Plans under the Initiative Riz were to sow 138,000 ha in 2008/09 in zones with over 800 mm of rain.





#### Source: IFPRI

Increasing the volume of production in each of the above systems will have an immediate impact on food security in the targeted regions by increasing the availability of rice for rural producing households. This is especially true in the Southern region around Sikasso, where upland rice is an attractive alternative to cotton, which is in the midst of a structural downturn due to falling international prices. In such a context, rice can provide both an important nutritional supplement and a cash infusion for households that have marketed surpluses. The impact on food security of expanded rice cultivation for households hit by the downturn in the cotton value chain is thus potentially

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enormous. Even in other areas not explicitly affected by the downturn in cotton, such as the Southern lowlands and areas next to the Niger River in Mopti and Timbuktu, increasing rice production can help improve food security and lower rates of malnutrition.

In terms of prioritizing zones of intervention and particular productive systems, in addition to the special problem posed by the crisis in the cotton value chain, there are good reasons to favor concentrating production assistance on developing both uplands and lowlands rainfed rice in Sikasso Region. As shown in Annex A, Sikasso is the next largest average producer of surplus rice after Segou. With a concerted effort to develop rainfed rice linked to the *Initiative Riz*, it would not be unrealistic to see the region double or triple its surpluses to become another large provider of rice for urban consumption while also meeting food security needs in the zone of production. Sikasso is also strategically located along the main transport axes consuming markets in Côte d'Ivoire and Burkina Faso, so it is also a potential supplier of rice exports. Lastly, its close proximity and good road links to the ORS/ON zone means that would be a natural expansion zone for private processors from Segou after demand for high-quality processing services begins to be saturated.

### AXIS TWO: IMPROVING RICE QUALITY

Improving rice quality is of critical importance to the rice value chain for two reasons. The first and most apparent reason is that improved quality is necessary for Mali to become a rice exporter. No importers in any regional market are interested in ordering large quantities of non-standard product with variable mixes of broken and long-grain rice combined with occasional impurities. The second reason, which is not as immediately apparent, is that improving quality provides the best and most direct way of overcoming the many obstacles that are standing in the way of increased vertical cooperation in the value chain between actors at the marketing, processing and production levels. Actors such as Groupe Ami, GGB and a few mini rice mills have realized that there are higher margins to be had from selling good-quality rice—but they are unable to increase their volumes in this segment on their own. They each need the collaboration of actors on other levels of the value chain. Mini rice mills and Groupe Ami, who both source paddy directly, need to cooperate with farmers to secure a supply of quality paddy. Other wholesaler/importers such as GGB need to work with mini rice mills to ensure high-quality supply. By working to break down the constraints that are keeping these actors from working together, USAID can not only help to develop the high-quality segment of the rice market, but it can catalyze much-needed structural changes in the value chain that will lead to an overall increase in efficiency.

The potential impact of increasing efficiency through stronger inter-firm cooperation along vertical linkages in the value chain can be enormous—especially in the ON zone. This will do much more than just improve quality; it could also lead to significant increases in volumes and the resolution of long-standing problems. One simple example would be the problem of tertiary canal maintenance. Currently there is little that neighbors, water user groups or farmer organizations can do to sanction individual cases of non-compliance with maintenance obligations. But within the framework of a larger agreement where farmers in a defined area receive direct price incentives from their buyers—possibly linked to paddy standards, verification of canal cleaning, the absence of water in fields at harvest, or even technical rates of transformation of paddy to hulled rice—the costs of non-compliance could rise significantly and serve to bring new social pressures to bear on non-performers. Higher-level value chain actors can also play a key role in helping farmers to resolve problems in input access and serve as a relay for pressuring the ON and the State to meet their irrigation infrastructure obligations. USAID can help to make this happen by encouraging the development of value chain alliances built on improved vertical cooperation focused on product quality in a way that includes, rather than excludes, private-sector actors in partnerships with farmers.

In terms of volumes, the potential gain from improving productivity in the ON through private sector-farmer alliances built around improved quality is hardly negligible. An increase in the technical yield rate for hulling from the current estimated average of 55 percent to a 70 percent maximum for perfect quality paddy on 10,000 hectares, or 1/10 of the cultivated ON lands, would yield an extra 9,000 tons of rice just from reduced losses in one season—or about one-quarter of the Timbuktu Region's estimated annual consumption needs.<sup>40</sup>

The initial geographic focus of quality activities would likely be on the ON/ORS zone—since this is the current center of trading activity, wholesaler/importer networks and mini rice mill investments. But there is no reason for activities in this axis to be limited to the Segou Region. As volumes of production and marketed surpluses increase in other zones (especially the adjacent Sikasso region) activities aimed at alliance creation and promotion of SME investment in processing technology can also be extended to these areas.

Activities to improve quality would be divided into two components:

**Component 1: Promoting private-sector-led investment in improved processing technology.** USAID would use private entrepreneurs to introduce improved processing technologies (mini rice mills) as part of a commercial strategy to increase sales of quality rice defined as either: (a) clean, polished rice that has not gone through any size calibration but is completely free of rice husk, debris and rice flour; (b) homogenous lots of sorted and calibrated broken rice; and (c) homogenous lots of pure 'extra-long' rice. Investment in equipment to produce these products can cost anywhere from \$5,000 to \$58,000,<sup>41</sup> so the level of target entrepreneur is at the SME level or above. Interventions should be focused on removing blockages to investment and buying down risk for potential new investors—as well as helping current actors to expand their processing activities. Illustrative activities would include:

- conducting technical and feasibility studies;
- establishing demonstration units and training potential investors as well as helping them to source equipment;
- developing standardized promotional materials for model technologies and helping investors with business plans;
- working with potential lenders to develop financing products and borrower profiles;
- working with BNDA/GOM to access possible guarantee funds that could facilitate investment credits;
- working with local government authorities in ON lands to facilitate land access and titling that would provide valid collateral to help private investors in rice mills to obtain working capital financing;
- helping to negotiate commercial agreements that link SME investors in mini rice mills with farmer organizations and local representative authorities including village associations and the local CRAs; and
- including a specific target for promoting investment by women-owned SMEs to ensure that women participate in the creation of new value added.

An important caveat to keep in mind that is relevant to this component is that the exact size and depth of the market for well-sorted, high-quality rice is still unknown. Given what would be probably a fairly inelastic demand, it is possible that this market could be saturated with an over-investment in new processing technology. Thus, there is a need for more research to assess the parameters of the demand in this market segment, which is further discussed at the conclusion of this report. Another important factor to note is that the development of export market linkages will need to be associated with new investments in processing technology, since this will ultimately provide a market beyond just the wealthy residents of Bamako.

<sup>&</sup>lt;sup>40</sup> This is assuming a 6 ton/ha yield.

<sup>&</sup>lt;sup>41</sup> This is for equipment only and does not include physical plant requirements.

**Component 2: Developing market-led systems to improve the quality of paddy production.** Actions under this component would be closely linked to the geographic patterns in investment resulting from the first component. The strategy would be to identify farmer organizations or even groups of individual farmers in the ON that agree to supply improved-quality paddy to mini rice mills or wholesalers/ importers. Potential partners include Faranfasi So and Faso Jigi, as well as ordinary first-level farmer organizations. The key idea is not that USAID will select "beneficiaries," but that constellations of private-sector players—led likely by mini rice mills but also by wholesaler/importers—will start to identify geographic areas of preference or partners of preference within the ON/OSR zone, and that USAID can accelerate this process by underwriting some of the costs of discovery and relationship building, while also directly aiding both partners to fulfill initial obligations to the other. Specific actions in this component could include the following:

- Extend existing models of rice storage developed by PACCEM for Faso Jigi and/or CSV/Trade Mali to include the storage of paddy rather than hulled rice. This would be developed in conjunction with defined demand from mini rice mills or wholesaler/importers who are interested in sourcing improved paddy. The addition of a quality grading and certification component for paddy could potentially play an important role in increasing the value added by existing storage schemes, although the costs of such services would have to be weighed against the market potential for a standardized high-quality product. The degree of investment in storage capacity would be set as a function of demand from identified downstream clients and the allocation of storage responsibilities between farmers and the buyers.
- Develop clear quality grading protocols for use in these "certified paddy warehouses" with appropriate equipment (sample huller and humidity meters to conduct grading test and cleaners/winnowers to eliminate impurities in threshed paddy accepted for storage). This would include the introduction of differential pricing for farmers based on sampled paddy quality. Management tasks/responsibilities could be shared between the private-sector partner and the farmer group—depending on the relative contributions and expectations of each party.
- Develop financing formulas based on stocks as an additional adaptation of the Faso Jigi model.
- Work out financing/subsidy plans with GOM authorities for warehouse construction/improvement as well as for needed equipment. The possibility of using subsidies available under the *Initiative Riz* for warehouse construction and equipment could also be raised.
- Extension advice through local technical partners and farmer trainings on post-harvest handling.
- Institutional support for farmer organizations adhering to the "private-sector partnership" concept. Supporting efforts such as those of Faranfasi So to convert multi-purpose farmer organizations into cooperatives may also be desirable.
- Work with local water user committees to implement participative management models in zones covered by participating farmer groups that impose real sanctions on households for non-adherence to agreed-upon commitments for tertiary canal maintenance.

### AXIS THREE: ADDRESS CRITICAL BUSINESS ENABLING ENVIRONMENT CONSTRAINTS

Although much can be done to improve the business enabling environment at the firm level by bringing value chain actors together around a clearly defined project to increase rice quality, a few key policy constraints are unlikely to be resolved without high-level commitment on the part of the GOM and without a wider consensus among actors in the value chain. In rough order of importance, the following are those constraints:

- Working with rice value chain actors to convince the government to stabilize and reduce the magnitude of import exonerations. Changes in the level of protection have a significant impact on the structure of the value chain—particularly in how they affect the business strategies of the wholesalers/importers. While local rice can still be produced and sold profitably even with no protection, wholesaler/importers have much less incentive to invest in improving their domestic supply chains when market equilibriums are regularly disrupted by fluctuations in the level of protection that significantly raise the attractiveness of imports. Thus it will be difficult to secure a commitment of these potential lead firms to the quality-raising axis of the strategy presented here until there is a stable and predictable level of protection. Since the motivation for the import exonerations has been mainly to lower prices, one possible solution to consider would be linking an agreement to fund the GOM's rice reserve stock (which could be used to release market pressure) with a commitment to set a stable level of protection for domestic producers at a rate well below the current 32 percent.<sup>42</sup>
- Working with rice value chain actors to convince the government to reorient future *Initiative Riz* subsidies for equipment and mini rice mills for farmer organizations; to support costs related to farmer organization participation in value chain alliances with mini rice mills; and for wholesalers/importers to supply higherquality paddy. Such subsidies could be used primarily to cover the costs of building warehouses and equipment to store paddy in good conditions.
- Working to promote voluntary market standards and an eventual Mali brand name for the highest-quality rice. Because of the current confused situation, individual wholesalers or mini rice mills focusing on quality will try to impose their own brand names as a unique mark of quality. While this lack of a standard vocabulary may cause some minor problems in the local market, it is a more serious obstacle to establishing brand recognition for Malian rice in foreign markets. To combat this, the GOM and the industry should investigate the feasibility of establishing of an export brand name (such as "Mali Long-Grain Gambiaka") and agree to set minimum quality standards for this—say less than 5 percent broken grains, polished with no impurities—and institute control procedures to ensure respect.
- Negotiating special agreement frameworks within the ON zone in a similar manner to what the MCC has done in the Alatona to allow for temporary experimental formulas for incentivizing both ON and farmers to respect obligations for secondary and tertiary canal maintenance. These should be applied in pilot areas defined by agreements between farmer organizations and private millers/investors. The exact definition of how this might work is quite complex, but some ideas put forth in the framework of this study included: specifying non-respect of commitments for tertiary canal upkeep as a cause for farmer expulsion along with non-payment of water user fees; allowing for longer-term concessions for secondary canal maintenance over larger areas rather than the current system of smaller annual bids; and moving to volumetric water metering within a framework of regulated access to larger hydraulic blocs (20-30 farms) with closure of access to water for the whole bloc in the event of non-respect of maintenance obligations.

<sup>&</sup>lt;sup>42</sup> The issue of setting the "right level" of protection is beyond the scope of this study. The study team believes that it is most important to set a stable level of protection that does not change from year-to-year. This level could be set at zero or it could be positive. There may be some justification for a positive rate of protection from a value chain standpoint if the objective is to encourage more investment by wholesalers/importers in upgrading the domestic supply chain. This is because such actors have strong underlying incentives to prefer working in the import channel—mainly stemming from the high degree of concentration in that market segment and the market power this affords them.

## **COORDINATION WITH OTHER DONORS**

It will be critical that the above strategy be discussed with other donors to avoid duplication of effort and to ensure that activities are complementary. The main potential for working at cross-purposes lies in the ON zone where the GOM has been quite active in soliciting donor support for expansion of irrigated perimeters. As a consequence, the majority of donor activities in the ON are focused on supporting the development of new irrigated lands. The MCC in particular is funding investments to bring 26,000 hectares in the Alatona section of the ON. The project is in its initial phase with 16,000 hectares being developed for small farmers beginning in the next campaign. Other major players financing new areas include Libya (with over 100,000 hectares planned) and the Netherlands.

Possibility for duplication of effort in the ON is relatively minimal outside of the area of production support. Donors have not yet addressed the issue of developing private-sector farmer alliances around processing and improved post-harvest handling and storage of paddy. This is not a focus of the recently signed MCC/MCA agricultural services contract with ACDI/VOCA, which will address only the very basic production needs of the small farmers in Phase I of the Alatona project. In fact, the only significant donor activity in the area of post-harvest technology and marketing in the ON zone is the CIDA PACCEM project, which is in its last few months.<sup>43</sup> While it is not yet clear what, if any, CIDA-financed activities will continue in the ON zone, it will be important for USAID to coordinate with CIDA regarding lessons drawn from PACCEM and the design of any future support to Faso Jigi or its primary group members.

Another potentially important donor project that is the GTZ-funded Programme d'Appui au Sous-secteur de l'Irrigation de Proximité (PASSIP). Although this project reportedly is not explicitly targeting the ON zone, its approach does include value chain elements and it has recently organized workshops on three rice market segments: Gambiaka, brokens and parboiled rice. It will also be important for USAID to investigate possibilities for complementary approaches and program synergies with GTZ.

Finally, Mali has announced its intention to sign a compact in September under the Comprehensive Africa Agriculture Development Program (CAADP) under the New Partnership for Africa's Development (NEPAD). This could provide a useful institutional framework for the necessary donor-GOM coordination on a joint rice strategy that focuses on key CAADP priorities such as land and water management and market access.

### **UPGRADING TRAJECTORY**

The suggested strategy presented above includes some highly controversial measures—particularly limiting or even eliminating the use of import exonerations and reorienting subsidies to farmer groups so that they no longer crowd out private investment. These measures are all the more difficult to take because there is no consensus among the main actors involved that they are even desirable. To increase the likelihood that the strategy will gain traction, as part of the initial launch, it would be desirable for USAID to organize one or more **rice value chain forums** organized around a unifying theme or themes that can be used to stimulate reflection among key value chain stakeholders and create some level of consensus.<sup>44</sup> The theme with the most immediate potential for creating consensus around needed actions would be "how to turn Mali into a consistent rice exporter." This is a theme that would bring together both private-sector actors and farmers and that is fully consistent with the directions announced in the GOM's *Initiative Riz*.

<sup>&</sup>lt;sup>43</sup> Other donor activities in the ON that are known to the study team include AFD programs which: (a) support Faranfasi So's institutional strengthening services to primary groups; and (b) a program of strategic management consulting designed to strengthen the ON's management systems. There is a donor working group for large-scale gravity systems that is chaired by the Netherlands.

<sup>&</sup>lt;sup>44</sup> A more traditional approach would be to hold value chain stakeholder meetings to validate a vision and arrive at a strategy with the inclusion of all key value chain stakeholders. Unfortunately, given the lack of common ground and wide variety in perspectives of value chain actors and the public sector figures responsible for rice, the study team believes that a less ambitious, more focused approach to creating value chain consensus needs to be applied, at least initially.

Reaching a consensus on such key questions as how to address quality constraints, where to locate processing investments and how to capitalize on subsidies to increase production would be a natural outgrowth of such a series. This initial consensus-building exercise should also jump-start the process of identifying the key stakeholders to participate in value chain alliances based on improved quality and, even more important, getting the key stakeholders to talk with each other.

After this initial phase of consultation, USAID will need to be prepared to commence support for implementation of the strategy. The most critical components of this initial support are listed below under each axis.

### AXIS ONE: SUPPORTING PRODUCTION

- Selection of zones of intervention and preparation of needed water infrastructure investment plans (if any).
- Deciding on the attribution of roles with the GOM and other donors (if any) active in the zones of intervention.
- Beginning the process of vetting and preparing/forming partner farmer organizations.

### AXIS TWO: SUPPORTING IMPROVED QUALITY

Critical initial threshold actions that must take place for the strategy to achieve its objectives under this axis include:

- constitution of one or more viable pilot projects implicating both private-sector actors (probably mini rice mills, wholesaler/importers or new investors altogether) and farmer organizations in the ON based on new private investments in improved processing technology; and
- planning for post-harvest improvements with the identification of investment requirements and a strategy for financing them with potential participation from private-sector partners, farmer organizations, the GOM and USAID.

### AXIS THREE: ADDRESSING BUSINESS ENABLING ENVIRONMENT CONSTRAINTS

- Formulation of a consensus between value chain actors and the GOM on the main elements of a plan to develop Mali's capacity to export rice with a focus on higher quality.
- Commitment on the part of the GOM to reduce the magnitude of import exonerations and set a predictable, stable level of protection.

# VIII. TOPICS FOR FURTHER INVESTIGATION

The lack of prior analysis posed a problem for the study team in two specific areas that could be addressed with further research. These are listed below.

### **TOPIC I: MARKET RESEARCH ON THE CONSUMER MARKET FOR RICE**

One key problem area that needs more clarity before a final strategy can be set is the question of the size and depth of the "high-end" market for good-quality rice. In particular, no data is available now that would allow private actors and USAID to judge the exact size of the local market for superior-quality rice or set targets for needed investments in improved processing technology. The team recommends that a rapid survey be conducted by Michigan State University within the framework of its Project to Mobilize Food Security Initiatives to address this lack of information. Questions to be addressed by the survey would include:

- What is the exact size of the current market for high-quality rice? Is this limited to Bamako, or are consumers elsewhere in Mali ready to pay a substantial price premium for clean, homogenous lots of local rice?
- What are the main points of sale for high-quality rice? What are the volumes flowing through them?
- What are the specific supply sources of these points of sale?
- How has demand evolved over the recent past?
- What has been the impact of import exonerations concerning low-quality rice on the high-end of the market?

## TOPIC 2: RESEARCH ON THE LINK BETWEEN RICE CONSUMPTION AND PRODUCTION AND POVERTY LEVELS

The links between rice production, consumption and production, and poverty are not well understood. This is particularly important given the apparent (but unconfirmed) recent increase in rice consumption levels. Another potential topic of interest within the framework of the Michigan State University Project to Mobilize Food Security Initiatives would be to investigate and quantify these linkages so that poverty and food security analysts would have a more precise idea of the impact that price changes in different levels of the rice market have on poverty levels. While some work has been done with social accounting matrices (Nouve et al) that can help model the impact of rice price changes on poverty, there is little quantitative analysis of the effect of changes in consumption, production and imports on rice price levels. Without such models, it is hard for policy makers to estimate the overall poverty effect of changes in rice production and availability. Questions that could be addressed by such research would include:

- What is the current state of rice consumption among different socio-economic categories? Has there really been a change in consumption levels? If so, how has this played out in different socio-economic categories and for what specific types of rice?
- What is the elasticity of demand for rice? How does this differ for varying qualities of rice in the market?

## BIBLIOGRAPHY

- Aw, Djibril and Geert Demer, "Making Large Scale Irrigation Systems Work: Reforms at Mali's Office du Niger." World Bank, 2004.
- Daouda Diarra, "Analyse des déterminants de la compétitivité du riz de l'Office du Niger sur les marchés nationaux et sous régionaux," Consultant report to TradeMali Project, December 2004.
- Diakité, Lamissa. "Note technique sur la filière riz au Mali." Bamako, Mali: Ministry of Agriculture Rural Economy Institute, 2009.
- "Evaluation du Contrat plan 2005-2007, Etat-Office du Niger-Exploitants Agricoles," 2007.
- Nouve, Kofi and Quentin Woods. "Impact of Rising Rice Prices and Policy Responses in Mali: Simulations with a Dynamic CGE Model." World Bank Policy Research Working Paper No. 4739. 2008. Ministre de l'Agriculture, Bilan de l'Initiative Riz: champagne 2008-2009, June 2009.
- Staatz, John and Valerie Kelly. "Mali Country Economic Memorandum, Agriculture and Rural Development," Michigan: Michigan State University Department of Agricultural Economics, 2006.

" Rapport de campagne 2007/8." Office du Niger.

## ANNEX A

### PERCENTAGE SURPLUS OF PRODUCTION OVER CONSUMPTION NEEDS

Region	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	Six Year Average	Ave Consump- tion Needs (MT)	Ave Surplus/ Deficit (MT)
Kayes	-98%	-95%	-98%	-89%	-96%	-98%	-96%	48,089	-46,005
Koulikoro	-60%	-68%	-24%	-68%	-69%	-55%	-57%	43,982	-25,216
Sikasso	104%	57%	123%	131%	-94%	63%	64%	37,656	24,100
Segou	376%	288%	353%	350%	271%	340%	330%	77,816	256,533
Mopti	18%	-31%	-30%	14%	-19%	24%	-4%	117,359	-4,694
Timbuktu	27%	-26%	69%	114%	-21%	59%	37%	41,806	15,468
Gao	-34%	-45%	-10%	1%	-56%	-53%	-33%	34,029	-11,173
Kidal	N/A	2,783	-2,783						
Bamako	N/A	8,614	-8,614						
MALI				-				412,134	197,616

Source: Michigan State University calculations from national statistics on consumption rates and production by region Note: Kidal and Bamako have no production. Average consumption figures from these Regions are from 2007/08 and 2008/09 only.

## ANNEX B

Source: Observatoire du Marché Agricole



Note: Local rice series if for mixed-quality unsorted rice. Imported rice if also for non-standard lower-quality imported rice that benefits from import exonerations.

# ANNEX C





Source: team calculation based on operations observed of mini rice mill in Segou and current prices for rice in Niono.

The left hand column gives the case of a farmer in the ON who achieved average yields and sells his rice to a collector after processing it with a small mobile huller. Assuming a hulling yield of 55 percent, which would be reasonable for a standard mobile huller operating with average-quality paddy, such a farmer would achieve a net margin after processing of 145 CFA/kg. By milling the same rice through a mini rice mill with a polisher and a technical yield of 62 percent, shown in the next column to the right, the farmer still comes out ahead despite an increase in the milling fee from 14 to 20 CFA/kg of milled rice. This is mainly because of the quality increase which should permit the farmer to raise his selling price from 300 to 325 CFA/kg. Even without the price increase, the farmer would still come out ahead because of the extra seven percent yield in volume from using the mini rice mill.

The two right hand columns show different perceptions of the case in which the farmer sells paddy to the mini rice mill. In the first column, with the mini rice mill buying paddy at 170 CFA/kg—which is the actual price being offered by an operating mini rice mill in Segou—the farmer would perceive this as being the equivalent of a net price of 309 CFA/kg for hulled rice if he had chosen to use a mobile huller. At this price, it is more attractive for him to simply sell paddy to the mini rice mill and not worry about the hulling as his net margin increases from 145 in the first case to 168 CFA/Kg. From the mini rice mill's point of view, however, it is not really paying 309 CFA/kg in hulled rice terms—but 274 CFA/kg since it gets an extra seven percent yield in hulled rice quantities. With a five CFA/Kg cost of hulling that assumes full capacity operation (as was the case in the prior year before the mini rice mill lost its main wholesaler/importer client), the mini rice mill itself captures a net margin of 46 CFA/kg. These figures are based on the current business strategy and costs structure of the mini rice mill with the largest volumes of the four mini rice mills visited by the study team.

# ANNEX D

## LIST OF INTERVIEWS

Name/Title	Organization						
Private Sector							
Modibo Keita, Administrateur Directeur General	GDCM-SA						
Hamidou Cisse, Responsable Riz	Groupe AMI						
Kalilou Diaby, Directeur Financier	Grand Grenier du Bonheur (GGB)						
Tidiani Koita	Semi-Wholesaler, Bagadadji, Bamako						
Sekou Sala Traoré	Sorters-Retailers, Grande Mosquée, Bamako						
Bounou Berthé							
Boubacar Diallo	Semi-Wholesaler, Bozola, Bamako						
Tambadou Moktar	Mini rice mill, Ségou						
Mah Diarra	Mini rice mill, Niono						
Sté Traoré et Fils	Mini rice mill, Bamako						
Brima Sinyagou	Mini rice mill, Beywani						
Amadou Sekou Dramé	Coordination Nationale des Operateurs du Secteur Agro-Alimenataire (CONOESAM)						
Sala Soumounou	Semi-Wholesaler, Ségou						
Donors/Projec	ts/Consultants						
Simon Boivin, Première secrétaire	CIDA						
Cheick Sadibou Keita							
Jaco Mebius (phone interview)	Embassy of the Netherlands						
Diadié Maiga, Coordinateur PACCEM	PACCEM/CIDA/Faso Jigi						
John Lichte, Senior Associate	IICEM/Abt						
Niama Nango Dembélé, Directeur	Michigan State University						
Kalilou Tigana, Directeur Suivi-Evaluation	MCA						
Jean Harman, Office Chief	USAID, Accelerated Economic Growth Team						
Gaoussou A. Traoré, Program Management Specialist							
Boré Sékou Salla, Directeur National	ASPM/CNFA						
Adama Dembele, Directeur Adjoint	Ferme semencier de Molodo						
Boubacar Guindo, Paysanne multiplicateur							
Daouda Diarra, Rural Development Program Officer	World Food Programme						
Amadou Sylla, Expert en technologie de transformation	CAE/Chemonics (former)						
Amadou Camara	MCC						
Public	Sector						
Lamissa Diakhité, Agro-Economiste	Institute d'Economie Rurale/ECOFIL						
Amadou Samaké, Chef de Programme							
Bakary Kanté, Conseilleur Technique	Cabinet du Premier Ministre						
Tidiani Traoré, Directeur du Projet MCA /Alatona	Présidence de la République du Mali						
Bakary Thiéro, Ingenieur Agronome	Office Riz Ségou						
Setdou I. Traoré, President Directeur General	Office du Niger						
Yaya Diarra, Chef de Service Conseil Rural							
Farmers/Farme	er Organizations						
Ibrahim Coulibaly, Président	Conseil Nationale des Organisation Paysannes du Mali (CNOP)						

Name/Title	Organization
Amadou Wai-Galo, Coordinateur	Faranfasi So
Mamadou Baba Koné, Président	Chambre Régionale d'Agriculture, Ségou
Association Villageoise de Fobugu/Brahima Coulybaly, Chef du Village	Association Villageoise Fobugu/Niono
Makono Dao, Conseilleur Agricole	Beywani/Niono
Banks/Service Providers	
Soungalou Sanogo, Chef de Service Microfinance	BNDA, Bamako
Bassiorou Diarra, Chargé d'Institutions de Microfinance	
Cheick Oumar Sissoko	ORIAM/Agritech SA (fertilizer importer)
Mamady Keita	Nyeta Conseils, Niono
Kongotigui Bengaly	